

A COMPARISON OF THE EFFECTIVENESS
OF TWO APPROACHES TO TEACHING
READING — THE INDIVIDUALIZED
AND THE BASAL READER

By

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CHAPTER I

INTRODUCTION

The teaching of reading as one of the skills of communication has been considered a responsibility of education since the beginning of history. Recent excavations and findings in the Near East have brought to our attention "textbooks" in the form of clay tablets, estimated to have been made as early as 2000 B.C., which required a degree of reading skill for anyone to benefit from them. The early Greeks attained great heights in the language arts and in literature as they made deliberate efforts to systematize grammar and to create a language of scholarship (11, p. 51). This achievement was predicated upon the ability to use reading as a skill for communication, and, therefore, we assume reading was taught in the earliest schools of which we have record.

We do not know what approach to the teaching of reading was used in these early schools and we can only assume that some of the pupils learned to read. History has recorded the development of reading pedagogy in American education and we are able to trace the emphasis from the religion oriented New England Primer through the spellers and dictionary of Webster to the McGuffey Readers, the forerunner of our modern graded system of basal reading instruction. The interest in education which has permeated American culture would indicate that from the beginning success in reading has been a common experience. As Woodring says,

"By any reasonable definition of reading the great majority of boys and girls today can and do read" (52, p. 40).

The question over which the reading controversy rages should be not whether Johnny can read but whether Johnny can read "as well as he needs to and can learn to" (52, p. 40). The ferment which is enveloping all phases of life today demands intelligent inquiry in all areas of knowledge. The inquiry into reading as a form of communication is based upon more than a recognized need for a knowledge of words and for the ability to put sentences together in a meaningful form. Our need today is for each Johnny to evaluate what he reads, to test assumptions in terms of all that he is and all that he knows. To read is to involve himself, to respond as an intelligent human being to the ideas expressed by the words, the sequence, the punctuation--the totality.

The use of the basal reader, with grouping of children according to their ability to read, for many years has been the most common approach to the teaching of reading. Perhaps as many as 90 percent of the schools today are using this approach as the foundation to reading instruction (41, p. 25). But there have been many serious questions raised by educators and by parents regarding the ultimate effect this method has upon reading achievement. They question the controlled vocabulary in this era of mass media in communication, the structured experiences for children whose horizons are in the boundlessness of space, the limited provision for individual potential when science and psychology have proven the vast differential in growth patterns throughout childhood, and the literary malnutrition provided by a single textbook when a rich and varied offering of literature written especially for

children is readily available. Reading specialists criticize the program as "stereotyped and lacking in vitality, creativity, and interest" (41, p. 25).

In an effort to meet some of these criticisms, experiments were begun in individualized approaches to reading. They differed from the basal approach in four major ways: (1) selection of material was made by the pupil on the basis of interest; (2) flexible grouping was according to need as diagnosed by the teacher; (3) teacher-pupil conferences replaced the structured class period; and (4) records were kept on individual achievement and diagnostic interpretation of specific needs.

Self-selection of reading material was initially proposed by Willard Olson after extensive studies in child development. The concept of a seeking behavior which selects those experiences which are consistent with maturity is applied to the selection of books and stories as well as to other environmental aspects (30, p. 402). Thus a child who has gained a concept of time in history may be challenged by a story of pioneer days while his peer who has not attained this level of maturity may find greater enjoyment in reading about the present day activities which he has experienced. The freedom to choose is one of the characteristics which differentiates the individualized approach from the basal reader approach.

The theory that grouping led to greater homogeneity in a classroom has been dominant in the basal approach to reading. Usually the class has been divided into three or more groups according to an estimate of ability as measured on an achievement test, or an intelligence scale, or possibly on the teacher's subjective judgment based on

observation. The reading program has then been adjusted in an effort to enable each group to achieve its assumed potential.

However, various studies in child development have shown that even with the most carefully selected criteria for grouping, wide differences still exist within each group (4, pp. 28-32). Therefore, recognizing that homogeneity is not achieved by grouping according to an estimate of potential, individualized approaches to reading have given attention to flexible grouping on the basis of a specific need. The group terminates for the individual child when the need no longer exists for him (24).

It logically follows that if each child is to select his own reading material, and if groups are to be formed only when several pupils can benefit from the same instruction or when group reaction to a common stimulus is desired, the structured "reading circle" and the regularly scheduled group reading period are no longer appropriate. They are replaced by teacher-pupil conferences based on whatever the child has chosen to read or on whatever his need is at that particular time, and by groups formed when more than one child can benefit from a common experience. This enables the teacher to give guidance in selection and to recognize and act upon the specific need of the child at the crucial moment. It also makes possible the utilization of reading material from subject matter areas such as the sciences and social studies as well as from traditional story books. The teacher-pupil conference encourages a system of record keeping based on diagnosis of need and progress rather than on the comparison of one pupil with another.

Need for the Study

There are many innovations and fads pressuring educators today. Each deviation from the traditional claims to be a panacea for some or all weaknesses present in our educational system. We have responded impulsively to new ways and new materials, often without waiting for experience to enable us to evaluate, select, and refine. This is as true in reading as it is in the other areas of teaching. The basal reader approach to reading, however, has been tried over many years and has been proven to be successful to a degree. Its weaknesses have been consistent and irritating but publishers of reading series have tried to overcome these problems with varying degrees of success. Vocabulary and content have been upgraded to challenge the child who is different in many ways from the child of twenty years ago. Stories have been rewritten to hold the interest of boys who have usually had more difficulty in learning to read than have girls. Companion volumes and high interest-low vocabulary books have been published as supplementary material to meet individual differences, and some series have two or three basal readers for each grade. But with all this, Johnny is not reading as he needs to read in this era of conflicting ideologies, economic anxieties, and unfathomable horizons.

Is it possible that the individualized approach to reading can do all that the basal reader approach can do and, in addition, succeed where the basal reader has been found lacking? This question cannot be answered by short term experimentations in individualization because true individualization is a philosophy which permeates the classroom, and which can be evaluated only by the final product—a mature adult who

enjoys reading and who interprets what he reads within the framework of what he is.

Research, however, must begin somewhere, and if we are to measure reading results we should begin as close to the point where reading begins as possible. Therefore we need research in individualized reading which begins before formal instruction in reading is initiated and continues until a point is reached where reading skills are established and the motivation for reading is lasting. This study was designed to measure the growth in reading skills from the point where formal instruction in reading began to the end of the second year.

Research also is needed which is controlled through continuous observation and measurement throughout the period of the study. Comparison of two approaches to reading based on data obtained from results on a standardized test after several years of reading instruction gives valuable data, but it does not give the assurance that the two approaches were adhered to with a tenacity that is desired if results are to be significant. Unless the teachers are kept aware of the conditions of the research throughout the entire study, practices can be initiated which cloud the distinction between the two approaches and thereby affect the results. A longitudinal study in which this awareness is promoted through frequent observation, evaluation, and measurement not only gives valuable data at any point in the study, but also gives greater assurance that the approaches to reading being tested are truly separate and definable quantities producing accurate and measurable results. This awareness was a criterion in the design of this study.

A final need for this study is emphasized by an analysis of the

controlled variables present in most of the current research. If many variables are controlled, the conclusions reached will apply to those situations which fit the defined category. For example, if all the subjects in the study fall within a specified range of intelligence and the teachers are matched on the basis of experience, the conclusions reached will apply to those groups which compare to the selected sample. We need research which will help determine whether one approach to reading produces better results than another approach to reading in typical public school classrooms taught by teachers qualified through certification and with enthusiasm for research. This study attempted to make the conclusions valid for many schools in a variety of situations by selecting a suburban school district in a residential area which is neither culturally disadvantaged nor affluent, classrooms which are heterogeneously grouped and self-contained, children who range in intelligence from low-average to superior as measured on an I.Q. scale, and teachers who are qualified through state certification and recommendation but who vary in experience and education.

Statement of the Problem

This study was designed to compare the basal approach and the individualized approach to beginning reading in relation to selected objectives, and to assess the influence of certain factors upon the achievement of these objectives. To make this comparison and assessment, the following questions were considered:

1. Are the skills of word recognition and comprehension developed to a higher degree under the individualized approach than under the basal approach to reading?

2. Do children taught by the individualized approach to reading with self-selection choose to read books that differ in number, type, and difficulty from the books read by children taught by the basal approach to reading?

3. Is the level of intelligence as measured by a standardized intelligence test a more significant variable in the development of reading skills for children taught by the individualized approach than for children taught by the basal approach to reading?

4. Do boys of the same grade placement and measured intelligence achieve as well on tests of reading achievement after two years of instruction using the basal approach as do girls?

5. Do boys of the same grade placement and measured intelligence achieve as well on tests of reading achievement after two years of reading instruction using the individualized approach as do girls?

6. Do boys of the same grade placement and measured intelligence achieve as well on tests of reading achievement after two years using the individualized approach as do boys who have been taught by the basal approach to reading?

7. Do girls of the same grade placement and measured intelligence achieve as well on tests of reading achievement after two years using the individualized approach as do girls who have been taught by the basal approach to reading?

8. Is a teacher more highly motivated toward teaching reading when the individualized approach is used than when the basal approach is used?

9. Is the socio-economic level of the family as estimated by occupation related to differences in reading achievement when a randomized sample of pupils is taught by each method?

10. Does the highest grade level in school attained by the mother relate to differences in achievement when pupils are taught by each method?

Plan of the Study

The plan of the study was to compare achievement in word recognition, comprehension, and attitudes toward reading at the end of two years of formal reading instruction by each of the two methods, using as subjects all children on whom complete data were available at the end of the second year. No effort was made to match either classes or teachers.

The subjects of the study were selected by random numbers from the kindergartens of each of three schools in one suburban school district. One class in each school was taught by the individualized approach to reading and one class was taught using the basal approach.

The teachers were selected upon joint recommendation of the Principal of each school and the Superintendent, and upon expressed enthusiasm for the study. Each participant held a bachelor's degree from some college or university having an accredited teacher education program, and each was certified to teach in the Illinois public schools. Years of experience varied from none to over twenty years in the primary grades.

Only one teacher had had formal training in the individualized approach to teaching reading. Therefore a series of seminars was conducted for all participants, to explain the philosophy and the variety of procedures possible under this approach. Following these introductory seminars, the two groups met separately for further clarification of their specific roles in the study and for exchange of ideas and experiences. The reading consultant from the Scott, Foresman and Company met with the basal reading teachers to further explain the philosophy and recommended procedures of the basal series used in this study, the well known "Dick and Jane" series.

An attempt to test the randomness of the sample was made through the results of the Metropolitan Readiness Test and the Kuhlman-Finch Intelligence Test which were administered in the first three months of the first year. The California Short-Form Test of Mental Maturity, Level 1, was administered to establish an intelligence quotient for each child in

the study. The scores for vocabulary and comprehension were obtained from the California Reading Test, Upper Primary, at the end of the second year. Attitude scores for both the first and second year were obtained from the San Diego County Inventory of Reading Attitude. Lists of books by title and author read by each child during the second year were also used as a measure of attitude and comprehension. A questionnaire sent to the home of each child obtained information on the occupation of the father, the education of the mother, and the number of siblings in the family (Appendix A).

The San Diego Teacher Inventory of Approaches to the Teaching of Reading, written statements by the teachers, and frequent observations and conferences were used to measure the motivation of the teachers using each method.

Whenever the data permitted, the conclusions were based on a statistical analysis using appropriate tests of significance. The mutual interrelationship between the occupation of the father and each of the variables, vocabulary, comprehension, and attitude, was measured by the Pearson product-moment correlation. The same statistical method was used to determine the correlation of each of the three variables with the education of the mother. Each correlation was calculated separately by sex.

The significance of the difference in type of book read by each Group was estimated by chi-square. The significance of difference in difficulty was estimated by a t-test.

Some comparisons did not lend themselves to statistical analysis and were dependent upon subjective conclusions drawn from observations

and unstructured interviews with many participants in the study.

Definition of Terms

By basal reading is meant a system of teaching reading using a coordinated series of readers and workbooks with a teacher's manual outlining in detail the objectives and procedures for each lesson. Identifying characteristics of this program are the controlled vocabulary, grouping according to the teacher's estimate of the child's ability level and potential to learn to read, and a promotion from one reader to another as the skills are progressively mastered.

By individualized reading is meant a program based on recognition of the differences in maturation at every age level. Through self-selection of reading materials that meet the pupil's needs, interests, and ability, it is assumed that the child's reading development will be commensurate with his total growth pattern. Characteristics of most individualized reading programs are the selection of reading materials from a library of trade books, magazines, and story collections, the teacher-pupil conference which replaces the scheduled reading group, flexible grouping for a variety of purposes, and the evaluation based on individual progress rather than on comparison of achievement with class or national norms.

The term Group in this study refers to all children being taught under one of the methods being compared. The basal reading group is identified as Group 1 and the individualized reading group, as Group 2.

The term Grade in this study refers to all children in one classroom being taught by one teacher. The first year Group 1 is

identified as Grades 11, 12, and 13; the first year Group 2, as Grades 14, 15, and 16. The second year Group 1 is identified as Grades 21, 22, and 23; the second year Group 2, as 24, 25, and 26. Thus the children of Group 1, Grade 11 were promoted to Group 1, Grade 21; the children of Group 2, Grade 16 were promoted to Group 2, Grade 26.

CHAPTER II

REVIEW OF THE LITERATURE

The literature in reading research is vast and varied. Many journals such as the Journal of Educational Research and The Reading Teacher devote entire issues to summaries and bibliographies of research reported each year. Because research in many areas touches on the questions dealt with in this study, it is necessary to select the literature and to refer to only a small part of the total published. Some of the general characteristics of the literature will be isolated and some important studies pertaining to the specific questions of this study will be described.

Analysis of the lists and summaries of research during the past five years reveals that there are trends in the interests of investigators. During 1959, 1960, and 1961 there were many articles and experiments on individualized reading; the literature of the past year (1965) has very little on individualized reading but a great emphasis on the psychology of reading and what might be called the physiology of reading. A summary by Robinson of 264 investigations into reading listed only one item that applied specifically to individualized reading and this was a reference to another summary which reported no studies later than 1962 (33).

Another characteristic of research in individualized reading revealed by analysis of the summaries is that very few studies were

longitudinal, beginning with the first grade. Duker refers to three investigations which involved the first grade (15), and Groff lists six of the thirty-two he reviewed as having taken place at the first grade level (18). Unless the studies were introduced prior to the beginning of formal reading, it is assumed that the initial approach to reading was through the basal reader since this method is by far the most common in our nation's schools.

Most of the studies reported were of short duration, from three weeks to ten months. Sartain drew conclusions on a controlled experiment that matched fifty-six days of individualized reading with fifty-six days of basal reading in the second grade (37). Adams drew conclusions after a study lasting 102 days in a first grade (1). Rosten reported no significant differences after a period of ten months (34). Of the thirty-two reviewed by Groff (18), none lasted more than one academic year.

A final characteristic revealed by a study of many investigations is that there is little agreement on a definition of individualized reading and, therefore, any comparison of studies is difficult. Some investigations equate individualized reading and the SRA Reading Laboratory (7, 22); others specify multi-level, self-scoring materials (17, 29); many others simply refer to "individualized reading" and the analyzer is left to assume the meaning of an ambiguous term.

Witty summarized the research in an article entitled "Individualized Reading--A Summary and Evaluation" in Elementary English (50), and McCullough made a similar review entitled "What Does Research Reveal About Practices in Teaching Reading?" which was published in the

English Journal (26). Both reported the research as being generally inconclusive, lacking provision for variable factors, and done by people more zealous than objective. Witty has published since this initial summary two other articles on individualized reading in which he describes the difficulty of evaluating the research because of the contradictory claims and the ambiguity of definition (49, 51). Nevertheless, Witty observes that "One of the most stimulating influences in producing more efficient reading instruction may be attributed to the widespread interest of teachers in initiating 'individualized' reading programs" (49, p. 211).

Two longitudinal studies, beginning with the first grade and continuing through the sixth grade, have given pertinent data for consideration. One was made in the University Elementary School of the University of Michigan, and the other in the elementary schools of Whittier, California. Both studies were a natural outgrowth of the need to evaluate an already existing program.

The Michigan study, reported by Anderson, Hughes, and Dixon (2, 3), analyzed the reading scores of children who had been enrolled in this school continuously from first grade through the sixth grade, and attempted to identify factors affecting the age of beginning to read and the rate of reading development. The approach to reading used in this school system closely resembled individualized reading as defined in this study.

The criterion used to determine "beginning to read" was eighty-four months on the Gates Primary Reading Test. It was found that less than half the children reached this level while in the first grade, and

that a significantly greater number of girls than boys reached this beginning point in the first grade. The analysis showed that 52.0 percent of the girls and 33.8 percent of the boys were beginning to read in the first year. By the end of the second year, 86.9 percent of the girls and 71.1 percent of the boys scored eighty-four months or better on the Gates Test.

Despite restriction in range--all the children in the study were superior in intelligence, the mean I.Q. being 120 with a standard deviation of 14.9 in the first grade--the study suggested that intelligence is an important variable in the total reading performance. Not only did those children with an I.Q. of 130 and over begin to read earlier but they also showed a greater rate of reading development over the six years. The reading development rate of one and one half years in reading age to every year in chronological age is attributed by the authors to the superior intelligence of the group studied. The late start in reading is attributed to the individualized method (2, p. 448).

The Whittier study was based on an individualized program that had been in effect for two years (14). Self-selection and individual conferences were characteristics of this study also. The question for which an answer was sought was "Do the children who had individualized reading for all their years in the elementary grades show progress on reading achievement tests consistent with district and national norms and with their own tested mental maturity expectancy?" (14, p. 108).

As in the study by Anderson, the data were obtained through an analysis of the test scores over a period of six years. A comparison was made with test scores based on five-year averages achieved prior to

the beginning of individualized instruction when all schools of the district were using the basal approach to reading. The results of this study indicated that through individualized instruction higher achievement scores were attained than when the basal approach had been the dominant pattern of instruction.

As stated above, it is dangerous to draw conclusions on a method of teaching reading by comparing the statistical results of controlled experiments in individualized and basal reading because of the great variation in the definition and practices of individualized reading. This is emphasized through the summaries of several studies conducted in elementary schools throughout the United States.

In 1953 a study by Palmer at the University of Utah resulted in the conclusion that while the development of reading skill in a fourth grade using an individualized approach was equivalent to reading skills achieved by other fourth grades using the basal approach, there were areas in which the children taught by the individualized approach achieved superior results. She reported that the individualized approach allowed alert children to grow in reading without deprivation and slower children to "grow in comfort." The individualized approach also allowed greater opportunity for creative activity in the classroom which in turn developed a higher level of creative thinking and greater incentive toward exploring interests. The effect on the teacher who taught by the individualized approach was a change in role from one of directing to one of guidance (31).

In an effort to compare the effectiveness of individualized reading and basal reading on beginning reading skills, Adams studied

eight first grades for development of skills in word recognition, comprehension, attitudes, and work-study habits. The basal approach was used with 88 children in four classes, and the individualized approach, with 84 children in four classes. The teachers were equated in terms of education, experience, and enthusiasm for the study. The results indicated that the individualized approach was particularly valuable for word recognition including both phonics and sight vocabulary. It was also strong in developing work-study habits and in creating positive attitudes toward reading. The basal approach was found stronger in developing comprehension although the differences were not statistically significant. In analyzing the results by sex, Adams found that girls made a significantly higher score in vocabulary when taught by the individualized approach, but that for boys the method used made little difference in development of vocabulary (1).

Two doctoral dissertations from New York University in 1960 were based on the comparison of an individualized and a group method of teaching vocabulary and comprehension skills in beginning reading. Using the California Reading Test to determine word identification skill, Izzo found no significant difference between scores achieved in each group (21). Braidford measured the comprehension achievement and also found no significant difference. There were 68 children in each group (8).

Karr reports a study made in Pittsburg, California, in which six teachers followed a carefully structured program of individualization which included selection of books from those books assigned to the classroom, pupil helpers, a strong word recognition program, and a

teacher-pupil conference of at least five minutes each week. Evaluation on the basis of the Progressive Reading Test at the beginning of the study and at the end of six months indicated that the experimental classes had not made as much progress in either vocabulary or comprehension as had the control classes in which the pupils were grouped for instruction. However, the teachers of the individualized classes were unanimous in preferring this method to the method of grouping for instruction because they believed that "pupils read more books, studied more, wasted less time, and gained in understanding" (23, p. 177).

Another six-month study was made by the second grade teachers of Roseville, Minnesota, Public Schools and was reported by Sartain (37). While this was also a controlled study comparing the individualized approach with the basal approach or the grouped for instruction approach, the interpretation of the term "individualized" and the design of the study make comparison with the Karr study difficult. While Sartain also was concerned with the progress made in reading skills, he attempted to measure the difference in skill development that a child made after three months of one type of instruction and the skill development the same child made after three months of the other form of instruction. Conclusions drawn from this study were that the capable student made approximately the same gains from either approach and that the slower student made a significantly greater gain under the basal reader approach. Unlike the teachers in the Karr study, the teachers in the Sartain study felt that individualization of reading was frustrating, and they preferred to continue with an enriched basal program which

would incorporate the conference period with the supplemental reading (37, p. 281).

Professional literature has repeated references to the relationship between reading achievement and attitude, indicating the importance of this aspect of development in the total growth of the individual. Because of the elusive definition of attitude, however, it is necessary to prescribe limitations to the term and to review only such literature as falls within the boundaries prescribed. In this study, the development of a positive attitude is the development of a desire to read and the enjoyment obtained from reading.

An effort to identify the factors that contribute to the development of a positive attitude toward reading has led to an analysis of the criteria children use in selecting books. The Center for School Experimentation of the Ohio State University published a study on independent reading in which primary teachers in the University School described problems and results observed when they began a program of individualized reading with self-selection. One part of the study was to determine whether a pattern of choice existed in book selection. It was found that children chose both easy and hard books in what seemed to be a random order, and did not use difficulty as a prime criterion in selection. The thrill of finding a familiar story, the recommendation of books by peers, teachers, or parents, and the excitement of being "on their own" were factors which seemed to spur an interest in reading that carried them beyond what would ordinarily be considered their reading level (38, p. 24).

The same study on the second grade level indicated that

independent reading increased the desire to read for information and for a specific purpose. The children became aware of the library as a place to obtain information on many areas of interest (38, p. 38).

In an article entitled "Changing Children's Attitudes Toward Reading" in Elementary English, Healy reports on an investigation into "more effective ways of developing a genuine liking for reading in children" (19, p. 255). She found that a plan which allowed children to choose reading groups according to interests and to select their own material was more conducive to developing a liking for reading than was the plan which grouped children according to ability to read. Healy states that "A combination of small group instruction, reading partners, and individualized instruction appeared to be promising" (19, p. 257).

From the studies which have been reviewed above, we recognize that research is not giving us a clear answer on whether, when, and how we should individualize reading instruction. The variables to be controlled in any study involving reading development are many and elusive. But the results obtained through research and the interest stimulated by the challenge of a new approach to an old problem merit further exploration and testing.

The interest in individualized reading has brought out strong division among educators and reading specialists. Among the proponents is Dr. May Lazar under whose editorship A Practical Guide to Individualized Reading was published by the Bureau of Educational Research, Board of Education of New York City (25). It consists of special reports which were originally a series of monographs on individualized reading that were made available to New York City teachers who wished to try the

individualized approach in their classrooms. While the publication is truly what it was intended to be--a practical guide--it also presents the historical development of individualized reading, an evaluation of its strengths as recognized in New York City schools, and a discussion of the misconceptions which frequently have caused teachers to be hesitant to attempt this approach.

Lazar and her associates believe that individualized reading has special values for both children and teachers which related to the nature of learning and personal growth. Among these values are the recognition of both the child and the teacher as individuals with unique needs, limitations, and satisfactions. Through individualized reading both are freed to become active participants in their own development--the child to learn and the teacher to teach. The "group caste barrier" is broken down for the child and the pressure of "contrived independent activities" is removed for the teacher. Instead, reading itself becomes a purposeful, independent activity leading to higher creativity for both teacher and learner (25, pp. 23-24).

A number of advocates of individualized reading have attempted to give practical assistance to teachers who desire to establish such a program in their classrooms. The result has been the recognition of what may be the most dynamic quality in this approach--its individualization for the teacher as well as for the child. Darrow and Howe, in attempting to describe approaches to individualized reading, state: "There was nothing static in the way programs of individualized reading instruction developed. With active responsibilities in diagnosing needs and planning for individual and group activities, teachers constantly

evaluated and reorganized their programs. As a result, no one technique emerged as the correct way" (13, p. 7).

Brogan and Fox acknowledge this same lack of conformity when they say individualized reading is not "a single system of teaching reading to be followed by all teachers. Rather the term refers to the variety of practices through which resourceful, sensitive teachers, working with and taking their clues from individual children, are helping each of them appropriately to move ahead in reading" (9, p. v).

As early as 1954, Jeanette Veatch described an individualized program as one which "provides each child with an environment which allows him to seek that which stimulates him, choose that which develops him most, and work at his own rate regardless of what else is going on" (45).

Later Veatch presented a proposed plan with detailed description of the role a child plays individually, in a group, and as a part of the entire class under a free program of individualization (46). Her continued enthusiasm for the personal growth of children through self-selection of reading material and through the ego-building effect of the teacher-pupil conference is further evidenced in an article "In Defense of Individualized Reading" published in Elementary English in 1960 (44).

But there are also authorities who because of their concern with the sequential development of skills raise a warning. Many are specialists who fear that without a well-defined program of skill development such as has been incorporated into the basal reader series, training in word attack, comprehension, and vocabulary may be ignored.

Heilman warns that "The great danger, from the educational standpoint,

is that systematic instruction in reading mechanics and skills can quite easily be slighted" (20, p. 126). The relationship between systematic instruction and the basal reader is emphasized by Tinker and McCullough when they say, "The particular sequence of introducing and teaching words and their meanings will be determined by which basic-reader series is used, by the organization of the school program, and by the instructional procedures preferred by the teacher" (43, p. 134). Russell, in compiling weaknesses of the individualized approach to reading, states that "Under incidental teaching, reading skills tend to be developed in a haphazard fashion, if at all" (36, p. 510).

Another area seen as a weakness of the individualized approach is the ability and training of the teacher. Spache raises the question, "Are teachers of individualized reading sufficiently trained to evolve their own comprehensive plans for the development of the essential reading skills?" (41, p. 158). He further raises a question on the competency of the teacher to identify a child's needs and prescribe a reading program through an individual conference (41, p. 158).

Bond and Wagner speak strongly for the basal reader approach when they point out what, to them, are the weaknesses of the individualized program.

It is difficult to see how so permissive a reading atmosphere could provide for basal reading instruction in skills and abilities essential to mature reading. For personal reading, a permissive atmosphere with independent individual reading is far more appropriate although, even here, experts in children's literature feel that the personal reading should be guided.

For the basic reading instruction and for instruction in topical units, such a plan appears unworkable. For one thing, reading is a complex process that must be taught systematically. For another, no teacher would be able to keep in mind the reading needs of each

child from week to week for the ten minutes, at most, of instruction he would be able to allot to a given child. Nor would he have time to teach even one selection each week to each child, for, it will be recalled, the steps in teaching a selection include teacher preparation, building readiness, introducing new vocabulary, setting purposes, reading silently, discussing, developing reading skills and abilities, and using the products of reading. And, too, children of elementary-school ages could not be expected to be mature enough to work alone for an entire week with but ten minutes or so of individual conference and instruction in the development of reading skills and abilities (6, p. 373).

However, there seems to be a general acceptance by most reading specialists that the individual approach to reading has many values which are difficult to attain under a basal reading program. Heilman (20, p. 127) and Stauffer (42, p. 381) suggest that perhaps it is not the basal reader in itself that is weak but rather the way it is used in many classrooms. To retain the positive attributes of the individualized approach and still have the guide lines of the basal reader approach would develop a combined reading program as outlined by Spache (40, pp. 148-324) and also recommended by Witty (51, p. 214).

In summary, the literature does not indicate a statistically significant difference between the individualized approach and the basal approach to reading in the achievement of reading skills. If there is an advantage of one method over the other, it is not revealed through standardized tests of vocabulary and comprehension. The individualized approach seems to create a greater interest in reading as shown by the number of books read. However, there are other variables that affect attitude toward reading such as the skill of the teacher, the classroom environment, and the example of the parents. Investigators have not been able to isolate the effect of the approach used from the effect of these other variables. Perhaps the greatest contribution of the re-

search literature thus far is to generate controversy which in turn may bring a new vigor and vitality into our reading program.

CHAPTER III

DESIGN OF THE STUDY

The purpose of this study was to compare two approaches to beginning reading by analyzing the results after a two-year period of instruction. Selected objectives and other factors which influence reading were identified, measured, and analyzed according to the approach used.

The objectives of reading cannot be measured merely by a statistical analysis of the scores obtained on a reading test or on the quantity and difficulty of books read over a specified period of time. An evaluation of a reading program must include a study of the atmosphere of the classroom, the motivation of the teacher, the response of the home, and the adaptability of the method to the community. Furthermore, as was stated above, the results of a statistical analysis or a subjective evaluation cannot be applied to any other situation than one comparable to that in which the study was done. It was important, therefore, to select a school community that would permit close observation, would actively support the study, and that had as many characteristics of a typical public school as possible.

The Locale

The study was conducted in a community which in many respects can be considered an average suburban community. None of the children came from homes that would be classified as culturally disadvantaged in

current terminology, nor did any come from the culturally elite. There were no mansions or gold coasts, no ghettos or slums in the district. Two of the schools were located in areas of single family residences with lawns, sidewalks, streets, and two-car garages. The other school was located in an area of town houses where three or four families lived under one roof but each family owned its particular section of the building. The buildings were modern but close together, and play space was at a minimum.

A questionnaire sent to a sample of 263 families who had children enrolled in the second grade of this district gave data on occupation, education of the parents, size of family, and marital status of parents. The sample included the families of the 134 children in the study. On the basis of the larger sample a description of the community was made.

Classified on the basis of occupation and education, this community was considered upper middle class. According to Warner's Revised Scale for Rating Occupations (48, pp. 140-141), the majority of families sampled were in a high Three category with many in Occupation One and none in Occupation Seven. The educational level of the parents was correspondingly high with fourteen years being the average number of years of formal education completed by the father and twelve years by the mother in the 263 families sampled. The families were young with 168 of the 263 families reporting children below school age at the start of the study. If data on marital status are accepted as indicative of stability, the families were relatively stable at this time, for of the 263 in the larger sample, there were ten homes in which divorce had

occurred, one in which husband and wife were separated but not divorced, and two where one parent was deceased. Of the 134 families represented in the actual study, there were one divorce, one separation, and no deaths.

The school curriculum was conservative and traditional. The organization was self-contained classrooms except for special teachers of art, music, and physical education. There was little innovation in any educational field, the financial strength of the district and what might be termed the professional strength of the entire staff being used to meet the most essential needs in educating the ever increasing number of children coming to the public school. Class size varied from 25 to 35 with an average size of 28 pupils at the time the study began. New schools were planned so they would open by the time the pressure became too great for good teaching. In a six-year period the district had grown from approximately 600 children to 6000 children enrolled in kindergarten through the eighth grade.

Because of these characteristics this district was chosen for the study. It seemed to be a district that had neither too much nor too little in material advantages. The teachers had to use a great deal of ingenuity to secure adequate and suitable materials, but through the two years of the study excellent libraries were established because of the support given by the administration and the parents. The schools had not been involved in organized research to any significant degree, so this study was begun in an atmosphere of expectancy and considerable doubt. The parents were enthusiastically cooperative, and the Board of

Education, Superintendent, and Principals gave their whole hearted support.

Selection and Training of the Teachers

In the spring of each year, the Administration was asked to recommend two teachers from each school to participate in the study. After a detailed description of the study and a discussion of the responsibility assumed by participation in this research, the teachers recommended were asked whether they wished to participate. All of them expressed an eager interest, and readily reached an agreement on who should teach each Group. All participating teachers held degrees from accredited colleges of teacher education and were certified by the State of Illinois. They varied in experience from none to over twenty years in the elementary grades.

The San Diego County Teacher Inventory of Approaches to the Teaching of Reading, given at the beginning of the study, indicated a strong bias toward the basal reader approach. This bias had been influenced by the adoption of one basal series throughout the district and by the familiarity they had with the basal reader philosophy from college experience. With but one exception, no one had tried individualized reading. One teacher had investigated the method and had used it successfully in the second grade prior to the study.

Because the teachers had little experience with an individualized approach to reading, and because they had not had the experience of teaching within the framework of a controlled study, it was necessary to organize a series of seminars to be held prior to the beginning of the

study, at intervals during the year, and again at the beginning of the second year of the experiment.

The first three seminars were held during the pre-school conference and during the first week of school. The first seminar was devoted to an explanation of the purpose and design of the study, the instruments to be used, and a brief description of the analysis of the data to be obtained. At the second meeting, the San Diego County Teacher Inventory of Approaches to the Teaching of Reading was administered. Because of the strong bias toward the basal approach evidenced by most of the teachers, it was necessary to devote the third seminar to the clarification of the distinction between the two approaches. The philosophy of individualized instruction and the philosophy of ability grouping were discussed and procedures for initiating reading instruction under the two approaches were identified. Those involved in the individualized method were given the freedom to establish the program according to their best knowledge, provided no grouping would be done on the basis of general ability as established by intelligence or readiness tests, no evaluation would be made that would identify a child on a continuum from failure to success, each child could select his own reading material under the guidance of the teacher, and individual conferences, with small groups for specific needs, would replace the organized reading groups. The basal reading teachers were instructed to follow the teacher's guide for the reading series as closely as possible, using as much of the recommended supplementary materials as time would permit.

Following the first three seminars which were attended by all the teachers of both Groups, separate Group conferences were held

throughout the year at which ideas were exchanged, progress was reported, and plans for collecting data were outlined. Demonstrations on developing reading skill in the individualized approach were given by the investigator for those teachers who requested such help. Arrangements were made through the Superintendent for teachers to observe in each other's classrooms, thereby sharing ideas and solutions to common problems.

While the teachers who were involved in using the individualized approach were perhaps in greater need of in-service education, the teachers using the basal approach discovered a need for a clearer understanding of the philosophy governing the basal reading program. Since the reading series being used was the Curriculum Foundation Series published by Scott, Foresman and Company, the basal reading teachers spent one day as guests of the reading consultant of that company, becoming better acquainted with the purposes, procedures, and materials of the reading program.

Frequent observations and conferences kept all teachers aware of the need to keep the guidelines clear in order that the data would truly measure differences in the results obtained by the two approaches.

Because it was not the practice in the district for teachers to be advanced with their classes, a new group of teachers was introduced into the study at the beginning of the second year. The same pattern of selection was followed, and a series of seminars was held to emphasize the method of instruction to be used.

Description of the Basal Reading Program

The basal reading program used in this study was the New Basic Reading of the Curriculum Foundation Series published by Scott, Foresman and Company. The teachers were provided with the Guidebook for each reader and were directed to follow it for all instruction in reading. The related material, the Learn to Listen, Speak, and Write series, was available if the teachers requested it, but it was not a requirement of the study.

During the first two weeks of school the teachers in the basal program used the first of the pre-reading books, We Read Pictures, as an aid in estimating the potential of each child. Such skills as interpretation, progression from left to right, formulation of sentences, and perceiving relationships formed the basis for the oral language program which centered around the large, colorful pictures of this book. As the teacher became better acquainted with the individual child through observation of his response to We Read Pictures, she was able to determine whether he was ready to go directly into Before We Read, the core text of the reading readiness program, or if he needed more introductory work with pictures and oral expression. Some children responded very quickly and were promoted to the basic readiness book without delay. The other children continued with the first book until it was finished, at which time the teacher identified those who were unusually slow in learning or who had special problems and might benefit from a continuation of the guided program in thinking, oral expression, motor skills, and perception. Thus three groups were formed: those who did not need the pre-reading picture books and who were able to grasp the more advanced

concepts and skills presented in Before We Read; those who needed the basic guidance presented in We Read Pictures, but who developed sufficient skill to go on to the readiness book without additional pre-readiness work; and those who needed more language experience than that provided in We Read Pictures and, therefore, continued with We Read More Pictures as their second book.

The teachers were aided in making this estimate of potential by readiness tests provided by the publishers of the texts, by the results of the Metropolitan Readiness Test, and by use of a modified form of the Check List for Reading Readiness by Russell and Ousley. A sincere effort was made to group the children homogeneously according to reading potential. A few pupils who were either too advanced or too immature to fit any group made individual teaching within the basal framework necessary.

After the class was divided into three or more groups on basis of ability, each group moved from one book to another according to the structured sequence of the series. Each lesson was taught according to the Teacher's Guidebook, and usually included motivation, presentation of new words, guided interpretation, silent and oral reading, and reinforcement through use of the workbook. The phonics program was carefully followed and suggestions for enrichment and extending competence were incorporated into the program whenever possible.

By following the Guidebook, the teacher was able to present a carefully controlled vocabulary. Through this plan each word was introduced in a meaningful way and was re-introduced and repeated at spaced intervals to assure mastery. By the end of the second year, 882 words

had been introduced to those children who had completed Book Two of the Second Reader.

The Think and Do workbooks reinforced the reading skills taught in class by presenting them in a different context. The Teacher's Edition of Think and Do gave procedures for use and indicated correct responses. The workbook was used as seatwork for two groups while the third group was reading with the teacher.

Not all groups had completed the first grade readers by the end of the first year. They were promoted to the second grade, however, with the understanding that they would begin their second year of reading instruction with the reader they were using at the end of the first year. While there was opportunity to move from one ability group to another at any time during the study, few changes were made after the initial assignment. The groups remained relatively unchanged between first and second grade.

Description of the Individualized Reading Program

The individualized reading program used in this study had four major characteristics. First, it was based on the principle of selection of reading material by the child with the guidance of the teacher. Most of the children were unable to read at the beginning of the first grade and, therefore, the books chosen in the process of self-selection were picture books or those books which contained familiar stories which the child could tell by following the illustrations. The oral language program with much emphasis on the awareness of one's environment through the development of the senses, the growth of the child as a person

through the development of skill in communication, and the constant invitation to read through reference to books as a source of information and enjoyment, was the foundation upon which the individualized approach rested. Experience charts, original stories, news, science, and weather reports were ways in which the groundwork for vocabulary study and reading readiness was laid. As the child began to realize that the words he had been using orally were also the words used in reading, he began to accept reading as being within his sphere of accomplishment and turned naturally to the books around him.

The initial emphasis on oral expression led naturally into a study of vocabulary and phonetic sounds. The words that were being used orally became the words that were recognized in written form, the words that were used for phonetic generalizations, and the words that were used in written communication. Thus the basic skills of word analysis were made an integral part of the individualized approach.

A second principle governing the individualized approach was that no grouping would be done on the basis of ability. The children who needed additional help on any area pertaining to reading and who would benefit by being a part of a group, all of whom had this same need, could be brought together for this purpose. When the purpose was achieved, the group would no longer exist.

A third guideline was that no evaluation would be made of the child which would compare him with classmates on his reading ability. This principle was based on the knowledge that children mature at different rates and that pressure to succeed or conform will not bring about the needed readiness for reading which is part of physical and

emotional maturation. Therefore, the report card sent to the parents had no grade in reading throughout the two years of the study.

A final characteristic of the individualized program was the teacher-pupil conference which replaced the scheduled reading class. The practice varied according to the teacher, some hearing every child read orally every day and others giving longer periods of individual attention less frequently. It soon became apparent that the reading conference was not limited to a reading period but that individual teaching of the skills of word analysis and comprehension entered into every area of instruction throughout the day. This collateral instruction, however valuable, did not replace the conference which increased in value as the teacher and pupil began to know each other better and began to interact in the task of learning.

Procedure for Collecting Data

In the fall of 1962, a letter was sent to the Superintendent of Schools, District No. 63, Illinois, requesting the opportunity to conduct a two-year study in three schools of that district. A brief summary of the design of the study was given. The Board of Education, through the Superintendent, granted the request and offered to underwrite the cost of the testing program that would be involved.

In April, 1963, the three schools were selected that seemed to have the most stable population in an extremely mobile metropolitan area. Through use of a random numbers table, the children, while enrolled in kindergarten, were selected who would be in each of two classes in each of the three schools. The number of children placed in each grade was determined by the average class size of all first grades

in the district which, at that time, was twenty-eight pupils. After the teachers were selected and had expressed an interest in participating in the study, they decided which teacher would use the individualized approach and which the basal approach to reading.

During the first two weeks of September, the Metropolitan Readiness Test was given by the teachers to all the first grades in the district. The percentile scores were thus obtained for the children in the study and were analyzed to verify the randomness of the sample. As an additional verification of the randomness of the sample, the Kuhlman-Finch Intelligence Test was given in November. It was administered as a group test with not more than eight children in each testing section.

During the fall a questionnaire was sent to the parents of the children in the study to obtain pertinent information on occupation, education of parents, size of family, and marital status (Appendix A).

In February, 1964, the San Diego County Inventory of Reading Attitude was administered on an individual basis, and in May, 1964, the California Reading Test, Lower Primary, was given on a small group basis. In order to assure uniformity of procedure, the tests were administered by the investigator rather than by the classroom teacher.

All children involved in the study were promoted to the second grade regardless of the achievement attained by June, 1964. The Groups remained intact except for the few who had moved away and a few who had been added during the year. The children who were not in either Group at the time the Metropolitan Readiness Test was given at the beginning of the first year, but who had joined the class at a later time, were

taught and tested as if they were part of the study, but their scores were omitted from the analysis.

In the fall of 1964, the questionnaire for data on the family and home was sent to an additional 129 families who had children in the second grade. This was done in order to have a broader base on which to define the characteristics of the community.

In November, 1964, the Kuhlman-Finch Intelligence Test was repeated for the purpose of testing the reliability of the I.Q. scores obtained in the first grade. Because of the discrepancy between the scores obtained in the first year and in the second year, the decision was made to administer a third intelligence test to establish I.Q. scores to be used in analysis of data. The California Short Form Test of Mental Maturity was administered in February, 1965, and I.Q. scores obtained were used in this study.

In April, 1965, the San Diego County Inventory of Reading Attitude was given as a group test, and in May, 1965, the California Reading Test, Upper Primary was given for scores on vocabulary and comprehension. Throughout the second year, a record of all books read by each child was kept by the teacher.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Many aspects of a reading program must be considered before a comparison between two approaches can be made. Some are differences which can be measured by statistical instruments but others must be evaluated with a less precise, more subjective procedure.

In this chapter, statistical data will be presented and analyzed upon which conclusions will be drawn regarding the following: (1) randomness of the sample; (2) the significance of method, intelligence, and sex on the selected objectives; (3) characteristics of books read; (4) relationship of socio-economic status to beginning reading; (5) relationship of education of the mother to beginning reading; (6) relationship of position in the family to beginning reading; and (7) teacher attitude toward method of instruction. In addition to statistical data, the bases upon which subjective conclusions were drawn will be given.

Randomness of Sample

The subjects for the study were chosen by random numbers from the total enrollment in the kindergartens of each of the three participating schools in the spring of 1962. The number of children assigned to each group was determined by the average class size for the first grades in each school. It was recognized that new children would be enrolled in the schools during the year and that a proportionate share of these children would need to be assigned to the classes participating in

this study. However, the data used in statistical analysis were obtained from those children who were selected by random numbering and on whom complete data were available at the end of the second year. While other children may have participated in the instruction and testing, they were not included in the study (47, pp. 280-281).

At the beginning of the study, 162 children were included with eighty in Group 1 and 82 in Group 2. Table 1 and Table 2 show the Grade size and the Group size by sex.

TABLE 1
COMPARISON OF GRADE SIZE BY SEX, FIRST YEAR

Grade	Approach	Male	Female	Total
11	Basal	19	10	29
12	Basal	12	14	26
13	Basal	12	13	25
14	Individualized	12	18	30
15	Individualized	14	12	26
16	Individualized	14	12	26

TABLE 2
COMPARISON OF GROUP SIZE BY SEX, FIRST YEAR

Group	Approach	Male	Female	Total
1	Basal	45	35	80
2	Individualized	38	44	82

In September the Metropolitan Readiness Test was given to all the first grades in the district with the median and interquartile range calculated for the 162 children in the study. While there was variation in medians among the Grades, the difference was not significant when the calculation was made by Groups. The median for Group 1 was the 85.83 percentile and for Group 2 was the 85.04 percentile. The interquartile range was 32.27 and 23.68 respectively. These data for Grades and Groups are shown in Table 3 and Table 4.

TABLE 3

MEDIAN AND INTERQUARTILE RANGE OF PERCENTILE RANKS
ON THE METROPOLITAN READINESS TEST BY GRADE

Grade	Approach	Median	Interquartile Range
11	Basal	76.75	37.69
12	Basal	83.36	45.68
13	Basal	92.69	12.97
14	Individualized	66.87	38.75
15	Individualized	88.27	13.64
16	Individualized	90.85	13.57

According to a review by Irving H. Anderson in the Third Mental Measurements Yearbook, the scores on the Metropolitan Readiness Test have high correlation with scores on intelligence tests. He says, "High correlations exist between scores on the Metropolitan Readiness Test and scores on intelligence tests. These correlations are of approximately

the same magnitude as the correlations between scores on different intelligence tests" (10). This would suggest that not only in readiness for reading but also in intelligence the two Groups were comparable.

TABLE 4
MEDIAN AND INTERQUARTILE RANGE OF PERCENTILE RANKS
ON THE METROPOLITAN READINESS TEST BY GROUP

Group	Approach	Median	Interquartile Range
1	Basal	85.83	32.27
2	Individual	85.04	23.68

Therefore, on the basis of number, sex, and reading readiness, the Groups were considered comparable at the beginning of the study, and the conclusion was made that the sample was truly random.

In November the Kuhlman-Finch Intelligence Test was administered to the children in the study. Again the median and interquartile range were calculated for each Grade and for each Group. Results are shown in Table 5 and Table 6.

While the difference between Group medians on the Kuhlman-Finch Intelligence Test was not great enough to be significant at the .05 level of significance, it was great enough to warrant further study.

By the end of the second year, the total sample had been reduced to 134 subjects, 65 in Group 1 and 69 in Group 2. Table 7 and Table 8 give the Grade and Group size by sex. These were the only subjects included in the data used for statistical analysis at the end of the second year.

TABLE 5

MEDIAN AND INTERQUARTILE RANGE OF INTELLIGENCE SCORES
ON THE KUHLMAN-FINCH INTELLIGENCE TEST BY GRADE

Grade	Approach	Median	Interquartile Range
11	Basal	113	21.67
12	Basal	118	12.80
13	Basal	120	12.40
14	Individualized	108	14.70
15	Individualized	113	15.13
16	Individualized	112	20.50

TABLE 6

MEDIAN AND INTERQUARTILE RANGE OF INTELLIGENCE SCORES
ON THE KUHLMAN-FINCH INTELLIGENCE TEST BY GROUP

Group	Approach	Median	Interquartile Range
1	Basal	118.5	16.50
2	Individualized	111.0	16.25

The scores on the Metropolitan Readiness Test were again analyzed for the 134 who remained in the sample. The median for Group 1 was 89.7 and for Group 2, 85.8. The interquartile range was 25.5 and 22.9 respectively.

TABLE 7
COMPARISON OF GRADE SIZE BY SEX, SECOND YEAR

Grade	Approach	Male	Female	Total
21	Basal	12	8	20
22	Basal	10	12	22
23	Basal	13	10	23
24	Individualized	10	13	23
25	Individualized	13	9	22
26	Individualized	12	12	24

TABLE 8
COMPARISON OF GROUP SIZE BY SEX, SECOND YEAR

Group	Approach	Male	Female	Total
1	Basal	35	30	65
2	Individualized	35	34	69

The Kuhlman-Finch Intelligence Test was administered again in the second year. The median for the 65 subjects in Group 1 was 116.5 and for the 69 subjects in Group 2, 112.5. The interquartile range was 18.6 for both Groups.

When only the 134 subjects who completed the study were included in the data, the differences in medians on the Metropolitan Readiness

Test, the Kuhlman-Finch Intelligence Test given the first year, and the Kuhlman-Finch Intelligence Test given the second year were not statistically significant at the 5 percent level. However, in every test, Group 1 had higher medians than Group 2. The conclusion drawn from these comparisons was that while the two Groups were alike at the beginning of the study, through a natural process of selection caused by families moving out of the district, or perhaps through some aspect of instruction such as emphasis on workbooks, Group 1, the Basal Group, achieved a higher median on the intelligence scale throughout most of the study.

Analysis of Test Scores, Second Year

The analysis of variance technique was used as the primary statistical procedure in investigating the data on skills and attitude because it allowed for testing the significance of possible differences between two or more means simultaneously. Thus the data could be classified according to method, intelligence, and sex, and the effect of each of these independent variables on the dependent variable could be tested with one procedure.

The analysis of variance also provided for testing the interaction effects of two or more independent variables on the dependent variable under investigation. Thus, in addition to testing the significance of the main effects, three first order interactions (method-sex; method-intelligence; and sex-intelligence) and one second order interaction (method-intelligence-sex) were tested for significance of possible differences between means.

The F ratio is an expression of the degree of significance of the difference between means whether testing main effects or the result of their interactions. A significant F does not indicate which means differ significantly but it does indicate that at least one mean is reliably different from some of the others. If F is not significant, there is no reason to test further because none of the mean differences will be significant. If F is significant to the degree designated for the data, the separate mean differences may be further tested by the t test to determine the source of difference (16, 27).

Analysis of Variance: Vocabulary,
Second Year

Partial data on which the computation of the analysis of variance for vocabulary was based are shown in Table 9 and the results of the analysis are given in Table 10.

Employment of an F test resulted in a value of .63 for method. A value of 3.92 was required for significance at the .05 level with one degree of freedom in the numerator and 120 degrees of freedom in the denominator. Therefore method as a main effect was not considered significant at the .05 level of confidence.

When the F test was applied to intelligence, a value of 21.83 was obtained. This was significant at the .001 level with one degree of freedom in the numerator and 120 degrees of freedom in the denominator. However, since the difference in mean of vocabulary scores by method was only .07 and the difference in mean by intelligence was 5.4, it was concluded that the significance of intelligence on vocabulary was not dependent upon either method used in this study.

TABLE 9
PARTIAL DATA USED IN COMPUTATION OF ANALYSIS OF
VARIANCE VOCABULARY, SECOND YEAR*

Group		Intelligence			
		Lower		Upper	
		Male	Female	Male	Female
1 Basal	ΣX=	501	443	810	724
	N=	14	13	21	17
	X=	35.79	34.08	38.57	42.59
2 Individualized	ΣX=	657	864	630	475
	N=	19	23	16	11
	X=	34.58	37.57	39.38	43.18

*For complete data see Appendix C, Table 37.

TABLE 10
ANALYSIS OF VARIANCE FOR VOCABULARY, SECOND YEAR

Source	df	Sum of Squares	Variance Estimate	F	Significance
Method	1	27.06	27.06	.63	—
Intelligence	1	942.64	942.64	21.83	.001
Sex	1	165.66	165.66	3.84	<.05
Interaction: (M X I)	1	1.57	1.57	.04	—
Interaction: (M X S)	1	40.24	40.24	.93	—
Interaction: (I X S)	1	85.71	85.71	1.98	—
Interaction: (M X I X S)	1	48.13	48.13	1.11	—
Within	120	5181.65	43.18		
Total	127	6492.66			

Employment of the F test on the sex variable brought a value slightly less than required for the .05 level of confidence. Interactions of the main effects were not significant at the .05 level of confidence.

In summary, the analysis of variance has indicated that intelligence was a highly significant variable in the development of vocabulary skills under both the individualized and basal methods of instruction. A review of the means given in Table 9 showed that both boys and girls on the upper half of the intelligence scale achieved higher scores than did the boys and girls on the lower half of the intelligence scale. The girls with higher intelligence achieved higher scores than did comparable boys, but according to the F ratio for the sex variable, the difference was not statistically significant at the .05 level of confidence.

Analysis of Variance: Comprehension,
Second Year

Partial data for and the analysis of variance of comprehension scores at the end of the second year are shown in Tables 11 and 12.

Employment of an F test resulted in a value of 1.02 for method. Since a value of 3.92 was required for significance, method as a main effect was not significant. The only sources of variance which were significant were intelligence at the .001 level of confidence and sex at the .01 level of confidence. The interactions were not significant.

Again, as with vocabulary scores, the analysis of variance indicated that the effect of method on the difference between means was not significant. Intelligence, however, had a highly significant effect

TABLE 11

PARTIAL DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
COMPREHENSION, SECOND YEAR*

Group		Intelligence			
		Lower		Upper	
		Male	Female	Male	Female
1					
Basal	$\Sigma X =$	437	405	856	784
	$N =$	14	13	21	17
	$\bar{X} =$	31.21	31.15	40.76	46.12
2					
Individualized	$\Sigma X =$	618	875	622	512
	$N =$	19	23	16	11
	$\bar{X} =$	32.53	38.04	38.88	46.55

*For complete data see Appendix C, Table 38.

TABLE 12

ANALYSIS OF VARIANCE FOR COMPREHENSION, SECOND YEAR

Source	df	Sum of Squares	Variance Estimate	F	Significance
Method	1	90.92	90.92	1.02	—
Intelligence	1	3098.81	3098.81	35.23	.001
Sex	1	683.21	683.21	7.77	.01
Interaction: (M X I)	1	186.64	186.64	2.12	—
Interaction: (M X S)	1	124.58	124.58	1.42	—
Interaction: (I X S)	1	113.97	113.97	1.29	—
Interaction: (M X I X S)	1	22.44	22.44	.03	—
Within	120	10555.24	87.96		
Total	127	14875.81			

upon the achievement of comprehension for both boys and girls on the upper half of the intelligence scale. The sex variable was highly significant also, with girls of higher intelligence achieving higher scores than any other classification, and girls of lower intelligence almost equaling the boys with higher intelligence when taught by the individualized method. Although the method was not significant, the mean made by the girls of lower intelligence may have contributed to the significance of the effect of sex on comprehension.

Analysis of Variance: Attitude,
Second Year

The data used in computing the analysis of variance on attitude scores are shown in Table 13 and the results of the analysis of variance are given in Table 14.

Application of the F test to means achieved on attitude scores resulted in no significance for either method or intelligence. Though the mean achieved by pupils with higher intelligence was greater than that achieved by pupils with lower intelligence, it was not of a magnitude to be considered significant. Likewise the mean achieved by the individualized group was higher than the mean achieved by the basal group, but the F ratio was not sufficiently high to be significant. The difference achieved in means by sex was significant at the .01 level of confidence with girls achieving higher means than boys. All interactions yielded scores less than required at the .05 level of confidence.

Analysis of Test Scores, First Year

This study was designed to analyze the statistical data obtained at the end of the second year. However, it was thought that more valid

TABLE 13

PARTIAL DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
ATTITUDE, SECOND YEAR*

Group		Intelligence			
		Lower		Upper	
		Male	Female	Male	Female
1					
Basal	$\Sigma X =$	210	230	327	318
	$N =$	14	13	21	17
	$\bar{X} =$	15.0	17.69	15.57	18.71
2					
Individualized	$\Sigma X =$	316	406	273	218
	$N =$	19	23	16	11
	$\bar{X} =$	16.63	17.65	17.06	19.82

*For complete data see Appendix C, Table 39.

TABLE 14

ANALYSIS OF VARIANCE FOR ATTITUDE, SECOND YEAR

Source	df	Sum of Squares	Variance Estimate	F	Significance
Method	1	35.21	35.31	1.87	—
Intelligence	1	34.96	34.96	1.85	—
Sex	1	184.44	184.44	9.78	.01
Interaction: (M X I)	1	2.04	2.04	.11	—
Interaction: (M X S)	1	8.41	8.41	.04	—
Interaction: (I X S)	1	9.47	9.47	.50	—
Interaction: (M X I X S)	1	3.18	3.18	.16	—
Within	120	2263.60	18.86		
Total	127	2541.31			

conclusions could be drawn if a comparable analysis of variance was calculated on data obtained at the end of the first year and the results compared. An analysis of variance was made, therefore, on vocabulary, comprehension, and attitude scores, using the same sources of variance as were used on the scores obtained at the end of the second year.

Analysis of Variance: Vocabulary,
First Year

Partial data upon which the analysis of variance for vocabulary scores was computed are shown in Table 15. The results of the analysis of variance are shown in Table 16.

The results of the analysis of variance of vocabulary scores at the end of the first year were comparable to results obtained at the end of the second year. Only intelligence and sex were found to be significant. However, while the significance of sex was beyond the .05 level of confidence both years, in the first year the sex variable resulted in an F ratio that was significant beyond the .01 level of confidence. Intelligence was as highly significant at the end of the first year as it was at the end of the second year, yielding an F ratio significant beyond the .001 level of confidence. All other sources of variance yielded values less than required for a .05 level of confidence.

Analysis of Variance: Comprehension,
First Year

Partial data and the analysis of variance on comprehension scores at the end of the first year are shown in Tables 17 and 18.

Data shown in Table 18 indicate that intelligence and sex were the sources of variance that were most significant in the analysis of

TABLE 15

PARTIAL DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
VOCABULARY, FIRST YEAR*

Group		Intelligence			
		Lower		Upper	
		Male	Female	Male	Female
1					
Basal	$\Sigma X =$	762	683	1308	1194
	$N =$	14	12	21	18
	$\bar{X} =$	54.43	56.92	62.29	66.33
2					
Individualized	$\Sigma X =$	959	1317	940	761
	$N =$	19	23	16	11
	$\bar{X} =$	50.47	57.26	58.75	69.18

*For complete data, see Appendix C, Table 40.

TABLE 16

ANALYSIS OF VARIANCE FOR VOCABULARY, FIRST YEAR

Source	df	Sum of Squares	Variance Estimate	F	Significance
Method	1	36.95	36.95	.29	—
Intelligence	1	2808.10	2808.10	22.40	.001
Sex	1	1128.54	1128.54	9.00	.01
Interaction: (M X I)	1	17.10	17.10	.14	—
Interaction: (M X S)	1	228.26	228.26	1.82	—
Interaction: (I X S)	1	54.17	54.17	.43	—
Interaction: (M X I X S)	1	9.97	9.97	.07	—
Within	120	15040.81	125.34		
Total	127	19323.90			

TABLE 17

PARTIAL DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
COMPREHENSION, FIRST YEAR*

Group		Intelligence			
		Lower		Upper	
		Male	Female	Male	Female
1					
Basal	$\Sigma X =$	106	73	197	211
	$N =$	14	12	21	18
	$\bar{X} =$	7.57	6.08	9.38	11.72
2					
Individualized	$\Sigma X =$	132	176	128	143
	$N =$	19	23	16	11
	$\bar{X} =$	6.95	7.65	8.0	13.0

*For complete data see Appendix C, Table 41.

TABLE 18

ANALYSIS OF VARIANCE FOR COMPREHENSION, FIRST YEAR

Source	df	Sum of Squares	Variance Estimate	F	Significance
Method	1	1.42	1.42	.13	—
Intelligence	1	383.64	383.64	32.82	.001
Sex	1	86.0	86.0	7.36	.01
Interaction: (M X I)	1	2.2	2.2	.10	—
Interaction: (M X S)	1	47.07	47.07	4.03	.05
Interaction: (I X S)	1	132.04	132.04	11.29	.01
Interaction: (M X I X S)	1	.24	.24	.02	—
Within:	120	1402.89	11.69		
Total	127	2055.50			

variance for comprehension scores at the end of the first grade. Method, as a main effect, was not significant. However, unlike the results of the analysis at the end of the second year, the interaction of method and sex was significant at the .05 level of confidence, and the interaction of sex and intelligence was highly significant at the .01 level of confidence. The higher mean achieved by the girls of higher intelligence taught by the individualized approach may have been the contributing factor to this difference.

Analysis of Variance: Attitude,
First Year

Partial data and the analysis of variance on attitude scores are shown in Tables 19 and 20.

The analysis of variance at the end of the first grade did not indicate that one approach to reading was more significant than the other approach in the development of a positive attitude toward reading. Intelligence was not a significant factor either. Sex, however, was significant at almost the .01 level in the first grade. This was comparable to results obtained at the end of the second grade as shown in Table 14.

Further Analysis of Significant Differences
in Test Scores, Second Year

According to the analysis of variance there was no significant difference between the means achieved on any of the three variables being measured after two years of instruction by the basal approach or the individualized approach to reading. The differences that were sig-

TABLE 19
 PARTIAL DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
 ATTITUDE, FIRST YEAR*

Group		Intelligence			
		Lower		Upper	
		Male	Female	Male	Female
1 Basal	$\Sigma X =$	238	192	335	346
	$N =$	14	12	21	18
	$\bar{X} =$	17.0	16.0	15.95	19.22
2 Individualized	$\Sigma X =$	289	431	282	213
	$N =$	19	23	16	11
	$\bar{X} =$	15.21	18.74	17.63	19.36

*For complete data see Appendix C, Table 42.

TABLE 20
 ANALYSIS OF VARIANCE FOR ATTITUDE, FIRST YEAR

Source	df	Sum of Squares	Variance Estimate	F	Significance
Method	1	15.28	15.28	.81	—
Intelligence	1	54.37	54.37	2.89	—
Sex	1	105.93	105.93	5.63	.05
Interaction: (M X I)	1	1.49	1.49	.08	—
Interaction: (M X S)	1	25.67	25.67	1.36	—
Interaction: (I X S)	1	19.99	19.99	1.06	—
Interaction: (M X I X S)	1	64.48	64.48	3.43	—
Within	120	2258.61	18.82		
Total	127	2545.82			

nificant were due to differences in intelligence or sex or to an interaction involving one or both of these factors. The data on vocabulary and comprehension, as shown in Tables 9, 11, and 13, do indicate that when the groups were matched by intelligence and sex, the means achieved by Group 2, the Individualized Group, were slightly higher for three out of four categories.

As shown in Table 6, an analysis of the intelligence scores revealed a higher median for the children in the Basal Group at the beginning of the first year. Considering the high significance of intelligence in the reading process, it would have been expected that the group with the higher median of intelligence would have achieved higher means on vocabulary and comprehension. Since the data did not confirm this expectation, it was concluded that the children in the individualized approach to reading made greater gain than the children taught by the basal approach although the difference was not great enough to be significant at the .05 level of confidence.

The analysis of variance indicated that of the factors being analyzed, sex was the only factor which influenced attitude to a significant degree. A review of the data showed that whether the basal or individualized approach were used, girls tended to have a more positive attitude toward reading than did boys.

Because of the high significance of intelligence and sex in the analysis of variance, a further comparison was made by using a t test on pairs of independent means. The results are shown in Table 21.

TABLE 21
SIGNIFICANCE OF DIFFERENCES BETWEEN PAIRS
OF INDEPENDENT MEANS

Source of Means	Variable	t	df	Significance
Basal, Low I.Q. Male (14), Female (13)	Vocabulary	.491	25	—
	Comprehension	.012	25	—
	Attitude	1.411	25	—
Basal, High I.Q. Male (21), Female (17)	Vocabulary	4.079	36	.01
	Comprehension	3.278	36	.01
	Attitude	2.521	36	.02
Individualized, Low I.Q. Male (19), Female (23)	Vocabulary	1.267	30	—
	Comprehension	1.678	30	—
	Attitude	.231	30	—
Individualized, High I.Q. Male (16), Female (11)	Vocabulary	.748	25	—
	Comprehension	2.614	25	.01
	Attitude	.718	25	—
Male, Basal Low I.Q. (14) High I.Q. (21)	Vocabulary	.923	33	—
	Comprehension	2.343	33	.02
	Attitude	.382	33	—
Male, Individualized Low I.Q. (19) High I.Q. (16)	Vocabulary	.889	33	—
	Comprehension	1.553	33	—
	Attitude	.273	33	—
Female, Basal Low I.Q. (13) High I.Q. (17)	Vocabulary	3.877	28	.01
	Comprehension	4.679	28	.01
	Attitude	.593	28	—
Female, Individualized Low I.Q. (23) High I.Q. (11)	Vocabulary	3.721	32	.01
	Comprehension	5.207	32	.01
	Attitude	.385	32	—
Male, Low I.Q. Basal (14) Individualized (21)	Vocabulary	.352	33	—
	Comprehension	.270	33	—
	Attitude	1.176	33	—
Male, High I.Q. Basal (21) Individualized (16)	Vocabulary	.158	35	—
	Comprehension	.614	35	—
	Attitude	.893	35	—
Female, Low I.Q. Basal (13) Individualized (23)	Vocabulary	1.345	34	—
	Comprehension	2.078	34	.05
	Attitude	.009	34	—
Female, High I.Q. Basal (17) Individualized (11)	Vocabulary	.238	26	—
	Comprehension	.311	26	—
	Attitude	.301	26	—

The results of the analysis of variance indicated sex and intelligence as the significant factors for achievement in reading; the results of the t test shown in Table 21 emphasize this finding by identifying the girl with high intelligence as the high achiever in vocabulary and comprehension regardless of method of instruction. Under the basal approach the differences between girls with high intelligence and boys with high intelligence were highly significant on all three variables; under the individualized approach the only significant difference was in comprehension. The girls with low intelligence did significantly better in comprehension under the individualized approach than did comparable girls under the basal approach. However, there was less difference between boys and girls of low intelligence under either approach than there was between boys and girls of high intelligence under either approach.

The analysis of variance indicated that sex was the only factor influencing attitude to a significant degree; the t test confirms this finding by identifying the girl with high intelligence, taught by the basal approach, as achieving the highest mean when measuring the development of a positive attitude toward reading. The very low t scores on attitude would raise a question as to whether any of the variables being tested were contributing toward the development of a positive attitude. While the analysis of variance gives a value beyond the 1 per cent level for sex, the comparison of t values does not consistently indicate a superiority of girls over boys on the attitude variable. The t test suggests that method could be a contributing factor although the values obtained were not of a magnitude considered significant in this

study. The conclusion drawn from the analysis of the data on attitude was that, while sex is a significant factor, girls achieving superior scores, the significance of method and intelligence is not clear. There may be an interaction here which is not statistically significant but which, when brought into play with other variables not being tested in this study, would influence the development of a positive attitude.

Analysis of Books Read

To determine the significance of the difference in books read by the two groups during the second year, a sampling of children from each group was made by random numbers. The books listed by the teacher for each of these children in the sample were analyzed for type, difficulty, and subject matter. Thirty-six children were selected from each group.

With reference to the Dewey Decimal Classification System, the books were classified according to the following eight categories:

- A. Easy (No plot)
- B. Fiction
- C. Things (Animals, Universe, Science, etc.)
- D. People
- E. Places
- F. Times (Holidays, History, etc.)
- G. Fairy Tales and Folk Legends
- H. Collections (Short Stories, Poetry, Jokes, Riddles)

Each category was then divided into twenty levels of difficulty, moving at five-month intervals from pre-school through the eighth grade. The Children's Catalog of the H. W. Wilson Company, and the American Library Association Library Journal were the chief sources for help in estab-

lishing the grade level of difficulty. Numerous other lists and reviews were consulted, and in a few instances, the investigator's evaluation of the book was the only source of information. Table 22 gives the twenty levels of difficulty and the grade identification given to each.

The total number of books read by the basal approach sample was 880; the total number read by the individualized approach sample was 2221. The average read by Group 1 was 24.44 and for Group 2, 61.69. A book was not listed as having been read unless the child had reported on it in such a way that the teacher was satisfied that the child understood the content beyond what he could have gained from the pictures.

A t test of significance between the two means gave a value of 46.46 which, with 3100 degrees of freedom, was significant at beyond the $P = .001$ level of confidence. More books were read by Group 2, and the books read were nearly five months more advanced than those read by Group 1. The data for number, difficulty, and type of book read are given in Tables 23 and 24.

The difference between the two groups as shown by books read is clarified by a frequency graph (Figure No. 1) of the cumulative percent of books read at each level of difficulty. The horizontal numbers refer to the coded level of difficulty given in Table 22, with columns one to four representing the very easy book including picture books. Column five represents books of first grade difficulty and column nine represents books of third grade difficulty. Since the sample was taken from the second grade, it would be expected that the higher percentage of books read would be within the five to nine interval. This expectation was verified with 79 percent of the total books read by Group 1 and 80

TABLE 22
 CODED LEVEL OF DIFFICULTY OF BOOKS READ
 IN SECOND YEAR OF STUDY

Code	Grade Level of Difficulty								
1	PS								
2	PS-K								
3	K								
4	K-1								
5	K-2	1							
6	K-3	1-2							
7	K-4	1-3	2						
8		1-4	2-3						
9		1-5	2-4	3					
10		1-6	2-5	3-4					
11			2-6	3-5	4				
12			2-7	3-6	4-5				
13				3-7	4-6	5			
14				3-8	4-7	5-6			
15					4-8	5-7	6		
16					4-9	5-8	6-7		
17						5-9	6-8	7	
18						5-10	6-9	7-8	
19							6-10	7-9	8
20								7-10	8-9

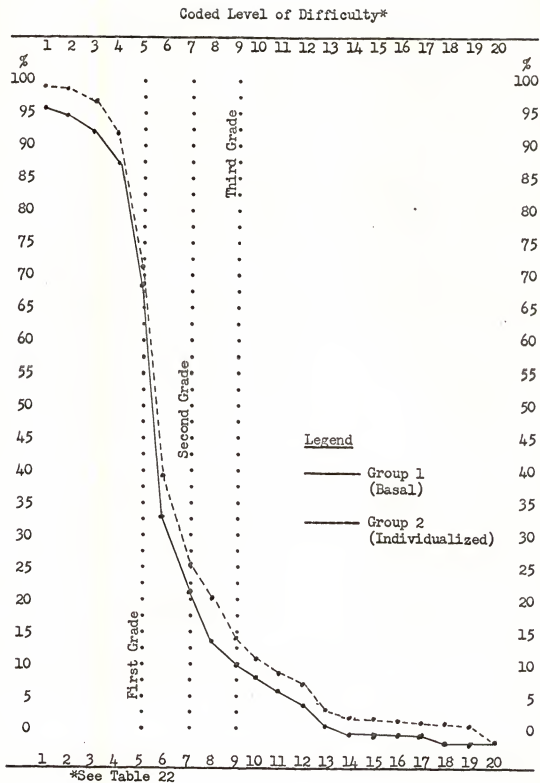


Figure No. 1. Cumulative Frequency in Percent of Books Read at Each Level of Difficulty.

TABLE 23

TOTAL NUMBER OF BOOKS READ BY SAMPLE FROM GROUP 1,
CLASSIFIED ACCORDING TO TYPE AND DIFFICULTY

Level of Difficulty	Type of Book								Total
	A	B	C	D	E	F	G	H	
1	32	5							37
2	11								11
3	8								8
4	36	4	3				5	1	49
5	130	16	11	1	4		4		166
6	199	88	24	2			7	7	327
7	80	15	16	1				5	117
8	4	23	5		1	3	3		39
9		17	11	3			1		32
10		2	6	4					12
11		8	1	2	1		1	3	16
12		10		5		1	3	5	24
13		16	10		2			1	29
14		5	6						11
15									0
16					1				1
17									0
18				1					1
19									0
20									0
Total	505	210	87	19	9	4	24	22	880

TABLE 24

TOTAL NUMBER OF BOOKS READ BY SAMPLE FROM GROUP 2,
CLASSIFIED ACCORDING TO TYPE AND DIFFICULTY

Level of Difficulty	Type of Book								Total
	A	B	C	D	E	F	G	H	
1	47								47
2	6								6
3	18								18
4	77		15				8	8	108
5	359	44	37	6		5	4	8	463
6	382	176	94	5	18	4	21	22	722
7	129	82	54	6	15	1		13	300
8	14	41	37	2	3	3		2	102
9		79	22	9	2	3	15	12	142
10		10	20	12			7	5	54
11		26	13	4		3	3	8	57
12		18	4	7		1	7		37
13		71	23	3	13		1	5	116
14		27	1					2	30
15		3	3		1				7
16		2		2					4
17		2	1						3
18				3					3
19					2				2
20									0
Total	1032	581	324	59	54	20	66	85	Grand Total: 2221

percent of the total books read by Group 2 falling on or within these boundaries. It is obvious from the graph, however, that Group 2 read proportionately more books beyond the second grade level than Group 1 read. At every level of difficulty except the very easy level, Group 2 surpassed Group 1, not only numerically as shown in Tables 23 and 24, but also when compared on a cumulative percent basis.

A chi-square analysis was used to determine the difference between the frequency that each type of book was selected by the two groups. Chi-square was equal to 38 which, with an N of 7, is significant at greater than $P = .001$ level of expectancy. It is therefore concluded that the children in Group 2 not only read more books of greater difficulty, but they also selected books more often from a greater variety of areas than did children from Group 1. Data for chi-square analysis are found in Table 25.

TABLE 25
CHI-SQUARE OF FREQUENCIES OF BOOKS READ
BY TYPE AND BY GROUP

Type of Book	Observed Frequency		Expected Frequency		χ^2
	Group 1	Group 2	Group 1	Group 2	
A	505	1032	436.17	1100.83	15.16
B	210	581	224.47	566.53	1.30
C	87	324	116.63	294.37	10.51
D	19	59	22.13	55.86	.62
E	9	54	17.88	45.12	6.16
F	4	20	6.81	17.19	1.62
G	24	66	25.54	64.46	.13
H	<u>22</u>	<u>85</u>	30.36	76.64	<u>3.21</u>
Totals	880	2221			38.71

df = 7

Relationship of Occupational Level
to Beginning Reading

In order to determine whether the occupational level of the father was related to scores achieved by the child in reading skill or attitude, the Pearson product-moment correlation coefficient was calculated by method and by sex for each of the three variables, vocabulary, comprehension, and attitude. The data for occupational level of the father were obtained from a questionnaire sent to the home at the beginning of the study (Appendix A).

Using Warner's Revised Scale for Rating Occupations (48, pp. 140-141), the families with children in the study were ranked on a scale from Occupational Level One (high) to Occupational Level Seven (low). According to Warner, Level Four of the Revised Scale for Rating Occupations is considered average, with three categories (Levels One, Two, and Three) above and three categories (Levels Five, Six, and Seven) below. When the occupations of the 134 families included in the study were rated according to this scale, 71 percent were above Level Four and only 11 percent were below the average set by Warner's study. The average for the families rated was in the upper half of the third category with no family rated at Level Seven. Because there were only two families at Level Six, these were combined with Level Five, and all further calculations were based on five occupational levels. The percent of the total families which fell in each occupational level was as follows:

Level One - 17 percent

Level Two - 21 percent

Level Three - 33 percent

Level Four - 18 percent

Level Five - 11 percent

The Pearson product-moment correlation coefficient was calculated to determine the relationship between the occupational level and the scores achieved on the California Reading Test and the San Diego County Inventory of Reading Attitude. The results are shown in Tables 26, 27, and 28.

TABLE 26

RELATIONSHIP BETWEEN OCCUPATIONAL LEVEL OF FATHER
AND VOCABULARY SCORE BY METHOD AND SEX

Group	Sex	N	r	Significance
1 Basal	M	35	.358	.05
	F	30	.239	--
2 Individualized	M	35	.179	--
	F	34	.099	--

The relationship between occupational level of the father and vocabulary score of the son was significant at the .05 level of confidence under the basal method of instruction. The relationship was not significant for girls under the basal approach, nor was it significant for either boys or girls under the individualized approach.

TABLE 27

RELATIONSHIP BETWEEN OCCUPATIONAL LEVEL OF FATHER
AND COMPREHENSION SCORE BY METHOD AND SEX

Group	Sex	N	r	Signif- icance
1 Basal	M	35	.505	.01
	F	30	.426	.02
2 Individualized	M	35	.105	—
	F	34	.209	—

The relationship between occupational level of the father and comprehension scores achieved on the California Reading Test was significant at a high level of confidence for both boys and girls taught under the basal approach but was not significant at the .05 level of confidence for either boys or girls taught by the individualized approach.

TABLE 28

RELATIONSHIP BETWEEN OCCUPATIONAL LEVEL OF FATHER
AND ATTITUDE SCORE BY METHOD AND SEX

Group	Sex	N	r	Signif- icance
1 Basal	M	35	.078	—
	F	30	.388	.05
2 Individualized	M	35	.199	—
	F	34	.211	—

The relationship between occupational level of the father and the attitude score achieved by the girls taught under the basal method was significant at beyond the .05 level of confidence.

According to this analysis there was no significant correlation between the occupational level of the father and the scores in vocabulary, comprehension, and attitude achieved by the children taught by the individualized approach to reading. The significant correlations involved only those children taught by the basal method.

Relationship of Education of Mother to Beginning Reading

Because of the close association the mother has with children during the early years of growth, it was hypothesized that her influence on language would be greater than the influence of the father. To determine whether there was a significant relationship between the education of the mother and the skills and attitude in beginning reading, the Pearson product-moment correlation coefficient was calculated in the same way as the relationship between the occupational level of the father and beginning reading was determined. The results are shown in Tables 29, 30, and 31.

The data obtained through the questionnaire (Appendix A) established a median of 12 years or high school graduation for the mothers of the children in the study. Only seven had less than 12 years and two had completed one year of graduate study.

According to the product-moment correlation there was no significant relationship between the education of the mother and vocabulary

development of the child as measured in this study. Neither sex nor method registered a significant influence on this relationship.

TABLE 29
RELATIONSHIP BETWEEN EDUCATION OF MOTHER AND
VOCABULARY SCORE BY METHOD AND SEX

Group	Sex	N	r	Signif- icance
1 Basal	M	35	.129	--
	F	30	.337	--
2 Individualized	M	35	.139	--
	F	34	.151	--

TABLE 30
RELATIONSHIP BETWEEN EDUCATION OF MOTHER AND
COMPREHENSION SCORE BY METHOD AND SEX

Group	Sex	N	r	Signif- icance
1 Basal	M	35	.194	--
	F	30	.230	--
2 Individualized	M	35	.204	--
	F	34	.315	--

No significant relationship was obtained between the education of the mother and the comprehension scores achieved by the children in this study. Although the r ratio for girls was higher than for boys

under both the basal and the individualized methods, it was not sufficiently high to be significant at the .05 level of confidence.

TABLE 31
RELATIONSHIP BETWEEN EDUCATION OF MOTHER AND
ATTITUDE SCORE BY METHOD AND SEX

Group	Sex	N	r	Significance
1				
Basal	M	35	.053	—
	F	30	.244	—
2				
Individualized	M	35	.287	—
	F	34	.003	—

No significant relationship was obtained between the education of the mother and the attitude scores achieved by the children in this study. Neither sex nor method were significant factors in this relationship.

Relationship of Position in Family
to Beginning Reading

In order to determine whether the position in a family had any influence on the attitude toward reading by either method, data were collected and analyzed identifying the child as an only child, the oldest child, the youngest child, or as having both older and younger siblings. Table 32 gives the means of attitude scores by Group, position in the family, and sex.

TABLE 32

MEANS OF ATTITUDE SCORES COMPARED WITH POSITION
IN FAMILY BY METHOD AND SEX

Position in Family	Basal		Individualized	
	Male	Female	Male	Female
Only Child	15.7	19.7	16.5	0
Oldest	17.1	18.5	17.4	17.2
Youngest	13.7	17.2	17.8	19.6
Between	15.0	17.3	15.9	20.6

The significance of sex in the development of attitude as shown by the analysis of variance was further verified by data from this table. In both groups the girls have higher means than the boys. But the difference between means on the basis of position in the family was neither great enough nor consistent enough to be significant. The conclusion, therefore, was that position in the family does not affect the attitude of the child under either method according to the data of this study.

Analysis of Teacher Attitude toward
Method of Instruction

The three criteria used in the selection of the teachers for the study were certification by the State of Illinois, recommendation of the administration of the district, and an expressed willingness to participate in the study. To determine the attitude of each teacher toward the two approaches to beginning reading being compared in this study,

the San Diego County Teacher Inventory of Approaches to the Teaching of Reading was revised to include only the basal and individualized approaches and was administered at the beginning and at the end of each year. The test is scored on a 15 to 55 point scale for each approach to reading and progresses from disagreement (low score) to agreement (high score) with the basic procedures and philosophy of the approach. The results of the test are given in Tables 33 and 34.

The difference between the scores on the basal and individualized approaches in the fall of the first year indicate that there was no clear distinction between philosophy or procedures identifying each of the two methods. With but one exception (Number 16), all the teachers favored the basal approach but found little disagreement with the individualized approach. After several seminars based on discussion of the differences between the two methods, and after a year of experience in one of the two programs, the distinction between the two became more clear. A comparison of the scores obtained in the spring with those in the fall indicates a trend toward favoring the individualized approach even by those teachers who were teaching by the basal method. One teacher (Number 11) moved toward greater agreement with the basal approach and greater disagreement with the individualized approach.

Figure No. 2 graphically shows the increase in ability to differentiate between the two approaches and the trend toward favoring the individualized approach at the end of the first year of instruction. The scores obtained by the teachers involved in the second year of the study indicate a sharper distinction in their understanding and practice of the two approaches. Figure No. 3 shows only one teacher (Number 25)

reversing her attitude from fall to spring. Since the teachers for the second year of the study were chosen with the same criteria as the teachers for the first year, it is doubtful that the difference in their scores was due to a difference in their education or experience in the teaching of reading. The difference may be due partially to the fact that most of the children were able to read at the beginning of the second year and therefore the procedures were more easily defined. Since the teachers who were to participate in the second year of the study were not selected until the spring of the first year, they were not included in the seminars and did not receive any formal instruction on the methods to be used. But the casual exchange of ideas and the spontaneous discussions on advantages and disadvantages of both approaches which took place among all the teachers in each school during the first year of the study may have helped the second year teachers clarify their attitudes toward the teaching of reading.

Observations, Conferences, and
Subjective Statements

In addition to statistical data, information was obtained through observation and through statements made by teachers, administrators, and parents. The writer visited each classroom at unscheduled intervals, heard the children read, talked with the children about reading, and observed the reading program being conducted. Conferences were held frequently with teachers and with principals to assess the impact of the study on individuals, on the class, and on the entire school. Parents were given an opportunity to express their reactions to the study when they had conferences with the teachers.

TABLE 33

SCORES ON SAN DIEGO COUNTY TEACHER INVENTORY OF APPROACHES
TO THE TEACHING OF READING, FIRST YEAR

Teacher	Method	Fall	Spring
11 Group 1	Basal	53	54
	Individualized	44	39
12 Group 1	Basal	46	35
	Individualized	42	52
13 Group 1	Basal	45	41
	Individualized	35	41
14 Group 2	Basal	48	19
	Individualized	33	50
15 Group 2	Basal	42	39
	Individualized	37	45
16 Group 2	Basal	33	25
	Individualized	50	52

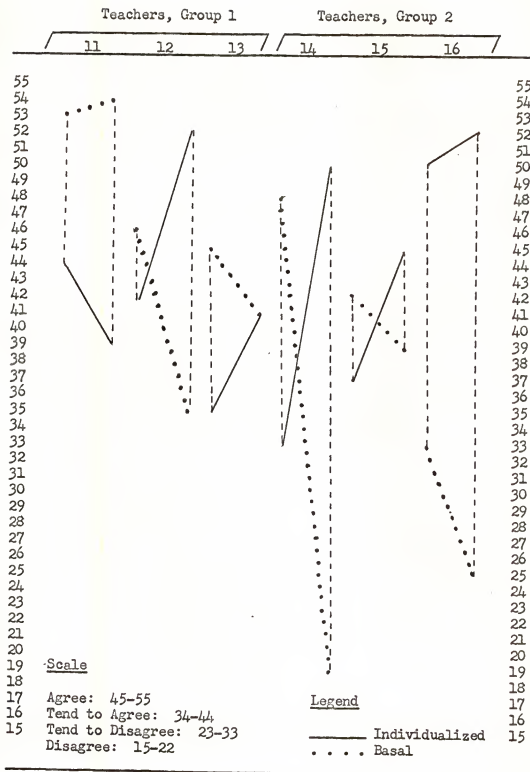


Figure No. 2. Degree and Direction of Change in Attitude of Teachers from Fall to Spring as Measured by the San Diego Inventory of Teacher Attitude.

TABLE 34

SCORES ON SAN DIEGO COUNTY TEACHER INVENTORY OF APPROACHES
TO THE TEACHING OF READING, SECOND YEAR

Teacher	Method	Fall	Spring
21 Group 1	Basal	48	52
	Individualized	33	26
22 Group 1	Basal	50	50
	Individualized	28	29
23 Group 1	Basal	49	47
	Individualized	21	27
24 Group 2	Basal	21	23
	Individualized	54	50
25 Group 2	Basal	48	46
	Individualized	41	48
26 Group 2	Basal	22	15
	Individualized	53	55

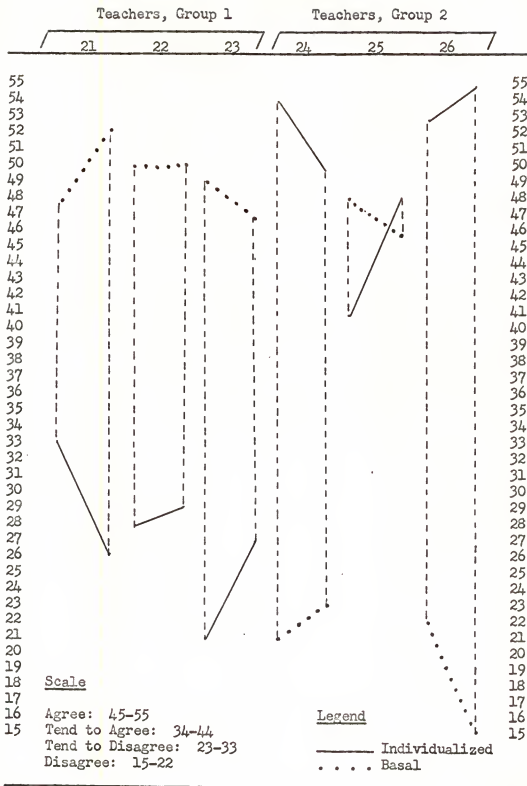


Figure No. 3. Degree and Direction of Change in Attitude of Teachers from Fall to Spring as Measured by the San Diego Inventory of Teacher Attitude.

At the end of each year teachers were asked to submit statements of procedures used, to describe materials developed, and to evaluate the study in terms of their response to the design of the study and the results they observed in the classroom. These written statements in addition to observations and conferences gave much data which could not be analyzed statistically but which were used in making conclusions.

Summary

Through the application of statistical measurement an attempt has been made to answer some of the questions rising from a comparison of a basal approach and an individualized approach to beginning reading instruction. The study was longitudinal, continuing over a span of two years, with 134 subjects participating in the instructional and testing program, with six different teachers involved each year.

After an analysis of the medians and interquartile ranges of the Metropolitan Readiness Test, the conclusion was made that the sample, chosen by random numbering, was truly random at the beginning of the study. None of the subjects had had formal instruction in reading prior to this time, and the Groups were almost evenly matched by number and sex.

The Kuhlman-Finch Intelligence Test was given at the beginning of both the first and second years. An analysis of the medians of both Groups on both tests indicated a difference approaching significance at the .05 level of confidence in favor of Group 1, the basal group. Because of the variation on individual scores on the Kuhlman-Finch Intelligence Tests, the California Test of Mental Maturity was given at

the end of the second year to establish intelligence quotients to be used in further analyses.

At the end of each year of the study, the California Reading Test was administered. An analysis of variance on scores achieved on the vocabulary section of this test resulted in the conclusion that, in this study, method was not a significant source of variance but that under either approach intelligence and sex were significant factors. A review of the means for both years revealed that children in the upper half of the intelligence scale achieved higher scores than children in the lower half, and that girls in the upper half achieved higher scores than boys in the upper half.

When the analysis of variance was applied to comprehension scores, intelligence and sex were found to be highly significant but the method of instruction was not significant. A review of the means revealed that the girls with high intelligence had achieved scores significantly higher than the girls with low intelligence and higher than scores achieved by all the boys. Girls in the lower half of the intelligence scale did as well as the boys in the upper half when taught by the individualized method.

When the analysis of variance was applied to scores obtained from administering the San Diego Inventory of Reading Attitude, the only significant factor was sex. A review of the means revealed that girls achieved higher scores than boys under both methods irrespective of intelligence.

An analysis of number, difficulty, and types of books read by a sample of each Group resulted in the conclusion that the individualized

approach to reading encouraged extensive reading, and that the books selected under this approach were more difficult and were chosen from a greater variety of types than were those read under the basal approach to reading.

To determine the influence of the occupation of the father on the reading skills and habits of the child, a correlation was made between each of the variables, vocabulary, comprehension, and attitude, and the scale for rating occupations developed by Warner. The result of the analysis led to the conclusion that the occupation of the father was positively correlated with reading skills developed through the basal approach to reading but that it had little relationship to the skills taught through the individualized approach. The occupation of the father was positively correlated with the development of a positive attitude toward reading for girls under the basal approach but had little effect on the attitude of boys under the basal approach or upon either boys or girls taught by the individualized approach.

In this study there was no significant correlation between the education of the mother and reading achievement of the child. The Pearson product-moment correlation yielded an r value less than that required for a .05 level of confidence for both the basal and the individualized approaches.

The motivation of the teacher toward teaching reading was a variable that was difficult to measure. As was seen in Tables 27 and 28 and in Figures 2 and 3, there was a trend toward favoring the individualized approach among first grade teachers. This trend continued to a lesser degree among the second grade teachers who demonstrated a

higher degree of ability to differentiate between the two methods than did the first year teachers. The real measure of motivation toward individualized instruction was the enthusiastic approach to solving problems and the creative atmosphere pervading the classroom. That this existed to a greater degree among the teachers of individualized reading than it did among teachers of basal reading could be only a subjective evaluation, but it was supported by statements from teachers and administrators.

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

The purpose of this study was to compare the basal approach to beginning reading with the individualized approach in achievement of selected objectives, and to assess the impact of certain other factors on the achievement of these objectives. The objectives selected were the development of word recognition skills, comprehension skills, and a positive attitude toward reading. The factors to be assessed in addition to those related to the methods being used were the socio-economic level of the family, the education of the mother, the position of the child in the home, and the attitude of the teacher toward the teaching of reading.

The study was longitudinal, extending over a two year period. It began before the children had been exposed to formal instruction in reading and continued until the end of the second year. Three schools in one suburban district were chosen for the study, with one individualized reading group and one basal reading group being taught, observed, and tested in each school.

Each year the teachers were chosen on the bases of recommendation by the administration, certification by the state of Illinois, and an expressed willingness to participate in the study. An in-service education program consisted of three seminars and frequent conferences with teachers of both groups.

The testing program consisted of the following: the Metropolitan Readiness Test and the Kuhlman-Finch Intelligence Test to establish randomness of the sample; the California Short-Form Test of Mental Maturity to establish an intelligence quotient at the end of the second year; the California Reading Test, Lower Primary to establish vocabulary and comprehension scores at the end of the first year; the California Reading Test, Upper Primary to establish vocabulary and comprehension scores at the end of the second year; and the San Diego Inventory of Reading Attitude to establish attitude scores at the end of both the first and second years. In addition the teachers were given the San Diego County Teacher Inventory of Approaches to the Teaching of Reading at the beginning and end of each year of the study to determine changes in attitude during the year of participation.

A statistical analysis of the data was made whenever possible. Some characteristics and results could be described only by subjective observation and analysis.

Conclusions

As was stated in Chapter I, in order to make a comparison between two methods of instruction, related questions need to be answered. These questions are restated here with the conclusions drawn from the results of the study.

1. Are the skills of word recognition and comprehension developed to a higher degree under the individualized approach than under the basal approach to reading?

On the basis of statistical analysis, the conclusion was made that the reading skills of word recognition and comprehension were

developed equally well under either approach to reading. The analysis of variance identified intelligence as a highly significant factor in the development of vocabulary and comprehension under both methods of instruction. Since evidence was presented that Group 1 had a higher level of intelligence when measured by the Kuhlman-Finch Intelligence Test at the beginning of the first year, the assumption was made that Group 2 had actually made more progress in developing reading skills in order to achieve equally with a group that was slightly superior in intelligence. The differences in final results were not significant at the .05 level of confidence, however, and the conclusion was made, therefore, that reading skills were developed equally well under either method.

2. Do children taught by the individualized approach to reading with self-selection choose to read books that differ in number, type, and difficulty from the books read by children taught by the basal approach to reading?

The analysis of books read by a sample of 36 children chosen randomly from each group revealed that the children taught by the individualized approach read over twice as many books as did the children taught by the basal approach to reading. The frequency with which books were chosen at each level of difficulty, shown in Tables 23 and 24, indicated that more books were chosen at every level except Level Two which was within the very easy classification. The data, shown graphically in Figure No. 1, indicated that children from Group 2 tended to choose more difficult books more often than did children from Group 1, taught under the basal approach.

A chi-square analysis, shown in Table 19, indicated that the children from Group 2, the individualized group, read more books from a greater variety of types than did the children from Group 1, the basal group. The conclusion was made, therefore, that under individualized reading with self-selection, children read more books, more difficult books, and books chosen more often from a variety of types than did the children from Group 1, the basal approach to reading.

3. Is the level of intelligence as measured by a standardized intelligence test a more significant variable in the development of reading skills for children taught by the individualized approach than for children taught by the basal approach to reading?

The analysis of variance resulted in a highly significant F value for intelligence but did not result in a significant value for method. The conclusion was made, therefore, that intelligence was not more significant in the development of reading skills under the individualized approach than under the basal approach to reading but that intelligence is highly significant under either approach to reading.

4. Do boys of the same grade placement and measured intelligence achieve as well on tests of reading achievement after two years of instruction using the basal approach as do girls?

The mean vocabulary score achieved by boys on the lower half of the intelligence scale was 35.79; for girls of comparable intelligence the mean was 34.08. The same boys achieved a mean of 31.21 and the same girls achieved a mean of 31.15 on comprehension. The conclusion was

made that boys and girls on the lower half of the intelligence scale made approximately equal achievement on tests of reading skill when taught by the basal approach.

The mean vocabulary score achieved by boys on the upper half of the intelligence scale was 38.57; for girls of comparable intelligence the mean was 42.59. The same boys achieved a mean of 40.76 and the same girls achieved a mean of 46.12 on comprehension. A t test resulted in a significant difference at the .01 level of confidence. The conclusion was made, therefore, that boys on the upper half of the intelligence scale do not achieve as well on tests of reading achievement after two years of instruction using the basal approach as do girls with comparable intelligence.

5. Do boys of the same grade placement and measured intelligence achieve as well on tests of reading achievement after two years of reading instruction using the individualized approach as do girls?

The mean vocabulary score achieved by boys on the lower half of the intelligence scale was 34.58; for girls of comparable intelligence the mean was 37.57. A t test indicated that the difference was not significant at the .05 level of confidence. The same boys achieved a mean score of 32.53 and the same girls achieved a mean score of 38.04 on comprehension. A t test indicated that the difference was not significant at the .05 level of confidence. The conclusion was made, therefore, that boys and girls on the lower half of the intelligence scale made approximately equal achievement on tests of reading skill when taught by the individualized approach to reading.

The mean vocabulary score achieved by boys on the upper half of

the intelligence scale was 39.38; for girls of comparable intelligence the mean was 43.18. A t test indicated that the difference was not significant at the .05 level of confidence. The same boys achieved a mean score of 38.88 and the same girls achieved a mean score of 46.55 on comprehension. A t test indicated that this difference was significant at the .01 level of confidence. The conclusion was made, therefore, that boys and girls on the upper half of the intelligence scale made approximately equal achievement on tests of vocabulary skill but that boys were significantly lower than girls in achievement of comprehension skills when taught by the individualized approach to reading.

6. Do boys of the same grade placement and measured intelligence achieve as well on tests of reading achievement after two years using the individualized approach as do boys who have been taught by the basal approach to reading?

A t test on differences in means achieved by boys taught by the individualized approach and boys taught by the basal approach resulted in a value that was not significant at the .05 level of confidence for either vocabulary or comprehension. There was no significant difference when boys on the lower half of the intelligence scale taught by the individualized method were compared with boys taught by the basal method. The same lack of significant difference was true of boys on the upper half of the intelligence scale. The conclusion was made, therefore, that boys of the same grade placement and measured intelligence achieve approximately equal results whether taught by the individualized or basal approach to reading.

7. Do girls of the same grade placement and measured intelligence achieve as well on tests of reading achievement after two years using the individualized approach as do girls who have been taught by the basal approach to reading?

A t test on difference in means achieved by girls on the lower half of the intelligence scale taught by the individualized approach and comparable girls taught by the basal approach indicated that only in comprehension was there a significant difference. There a difference between a mean of 31.15 and 38.04 resulted in a significance at the .05 level of confidence. The conclusion was made, therefore, that girls of lower intelligence achieved significantly higher scores in comprehension under the individualized approach than comparable girls did under the basal approach, but that in vocabulary the achievement was approximately equal. The conclusion was made that girls on the upper half of the intelligence scale achieve approximately equal scores on vocabulary and comprehension whether taught by the individualized approach or the basal approach to reading.

8. Is a teacher more highly motivated toward teaching reading when the individualized approach is used than when the basal approach is used?

The motivation of the teacher toward reading was difficult to assess. The results of the San Diego County Teacher Inventory of Approaches to Reading, administered the first year, indicated a confusion in differentiation between the two methods at the beginning of the year and a preference for the individualized approach by all of the teachers of Group 2 and two of the teachers of Group 1 by the end of the year. The data are shown in Table 27 and Figure No. 2.

The results of the San Diego County Teacher Inventory of Approaches to Reading, administered the second year, indicated a tendency for each teacher to prefer the method she was using. These data are shown in Table 28 and Figure No. 3. A comparison of Figures No. 2 and No. 3, however, reveal that both years greater change took place in the attitude of teachers of the individualized approach than in the attitude of teachers of the basal approach. This degree of change was interpreted to mean a more dynamic evaluation of the process of reading instruction which may have influenced motivation.

Statements from the teachers indicated an enthusiasm and excitement over individualized instruction that was not evident under the basal method, but statistical evidence of a higher degree of motivation toward the teaching of reading for the teachers of Group 2 is inconclusive.

9. Is the socio-economic level of the family as estimated by the occupation of the father related to differences in reading achievement when a randomized sample of pupils is taught by each method?

The Pearson product-moment correlation between the socio-economic level of the family as measured by the occupation of the father and reading achievement resulted in a significant positive correlation with vocabulary for boys and with comprehension for both boys and girls taught under the basal approach. There also was a significant positive correlation in attitude for girls taught under the basal approach. These results are shown in Tables 20, 21, and 22. There was no significant correlation between the socio-economic level of the family and reading achievement or attitude development under the individualized

method. On the basis of these findings, the conclusion was made that the socio-economic level of the family as estimated by the occupation of the father is related to some aspects of achievement under the basal approach to reading.

10. Does the highest grade level in school attained by the mother relate to differences in achievement when pupils are taught by each method?

The Pearson product-moment correlation between the highest grade level in school attained by the mother and reading achievement resulted in no significant correlation with either method. The conclusion was made, therefore, that in this study the education of the mother was not a significant factor.

Implications for Curriculum Change

The study could end here—an answer has been found for each question that was asked. But with each answer have come more questions which are as pertinent to the original problem as are those questions which were answered. If curriculum change is to be initiated through research such as that used in this study, these related questions need to receive thoughtful consideration and further analysis.

Grouping

One of the characteristics that distinguished between the individualized approach and the basal approach used in this study was grouping on the basis of an estimate of ability. (Since the estimate of ability was based on the results of the Metropolitan Readiness Test and on observation of general readiness to learn, as well as on reading

readiness, the term ability in this study refers to both mental ability and reading potential.) Group 1, the basal approach, used the high, average, and low ability groups as a basic organization for reading instruction; Group 2, the individualized approach, used flexible grouping on the basis of need as the primary organization for reading instruction. The design of the study provided for a fluid organization in Group 2 to prevent any child from becoming identified with a permanent group formed for instruction in reading.

Because the study was designed to make ability grouping a characteristic of Group 1 and no grouping on the basis of ability a characteristic of Group 2, the results of the study were interpreted as a comparison of ability grouping and non-grouping. The conclusion was made that grouping on an estimate of ability was non-effective since reading skills were developed equally well under either method. Grouping in itself was not a causal factor according to these results.

One of the arguments given by teachers and reading experts who defend grouping is that it saves time for the teacher, enabling her to reach all the children who need her help. Likewise, the individual approach has been challenged as being too time consuming, that the day is not long enough to teach each child individually.

When the teachers of Group 2 were asked whether they felt they had time to meet the reading needs of their pupils, the unanimous reply was that they had more time under the individualized approach than they had experienced with teaching through grouping. One teacher explained that "Now I can use these three, four, and five minute periods for real

teaching. A two minute discussion of a book with a child is sometimes all he needs to go on successfully."

Another teacher commented on time saved by eliminating the need for re-teaching. She said, "The psychological moment for teaching is when the need is pressing. I am recognizing the need of each child now that I know them better. Therefore I am finding I spend much less time re-teaching."

Another doubt about individualized reading frequently expressed by teachers is whether or not they can hear each child read each day. When the teachers of Group 2 were asked whether they felt they were able to have a reading conference with each child each day, one replied, "Not if a reading conference implies oral reading from a story book. I have found my understanding of the reading process has broadened for I am now conscious of teaching reading as communication in almost every act of teaching whether it be in arithmetic, science, or spelling. In that sense I reach each child many times a day."

According to observations made in this study, grouping by an estimate of ability did not result in the achievement of greater success in reading, it was not more economical of the teacher's time, and it was not the only way in which teachers could reach all the children in their large classrooms. Individualized teaching produced equal results for the children and elicited greater enthusiasm from the teachers.

✓ Developmental Program

Another distinguishing feature of this study was the lack of a specific developmental reading program in Group 2. Reading experts have

expressed doubt whether reading skills can be taught without a systematic program. Heilman, when discussing the individualized approach, wrote, "The great danger, from the educational standpoint, is that systematic instruction in reading mechanics and skills can quite easily be slighted. The implication is not that such an outcome is inevitable, but rather that it is one of the major pitfalls of the individualized reading approach" (20, p. 126).

In this study there was no structured developmental reading program for the individualized approach. The teachers of the basal approach taught the phonetic program developed in the series of basal readers. All the teachers of the individualized approach taught a phonetic program outside of the reading program. It was usually associated with spelling or writing, but was applied to reading only as an answer to the need for word analysis and recognition. Likewise with other skills. If there was a need, it was taught either to individuals or to large or small groups. On the basis of this study, one might conclude that systematic instruction is less important than psychological timing, teaching on the frontier of need. That this was not a pitfall for the teachers involved in this study was shown by the results of the tests and by the obvious enthusiasm for reading.

Self-Selection

Individualized reading emphasized self-selection of reading materials under the theory that interest is an important factor in motivation. The data of this study suggest that mastery of skills is equally great with materials selected and graded by the publishers of basal reading series, but that the enjoyment of reading and the desire to read

are developed to a greater degree under the approach that emphasizes self-selection. This may be the result of the active involvement of the child in his own learning process. Freedom of choice is an important part of self-involvement and leads to the development of independence and the acceptance of responsibility (5, p. 61). We recognize that in the philosophy of the basal reader system there is no opportunity for the child to select instructional material and limited opportunity for choice in other reading.

Out of this study has risen the question whether there is true freedom of choice and self-selection in the individualized reading program of the primary grades. Prior to the development of a fair sight vocabulary and the rudiments of word analysis, there are very few books which first grade children can read. Picture books tend to be too infantile to hold the interests of children at this level of maturity, and the desire to read books they are not capable of reading causes deep frustration.

An effort to provide reading material for this age group has been made in a number of trade books that fall under the various slogans of "Easy-To-Read" and "Read-It-Yourself." Russell has made an evaluation of ten of these easy to read books and discovered that readability as measured by the Spache Readability Formula ranged from 1.7 to 2.9 in grade level placement (35). Obviously, even though these books may be easy to read, they are not easy enough to give an experience of success and enjoyment in reading to children who are in the initial stages of the reading process.

Almost in desperation teachers of the first grade, using

individualized reading, have turned to pre-primers and primers of a number of basal readers as the only books available from which children could choose with any hope of successful reading. But the controlled vocabulary and the stereotyped situations fall far short of the dynamic oral language and the broad interests of the children they are teaching. Smith, in a study comparing interests of first grade children as expressed through their selection of library books, with interest categories of pre-primers and primers, found that the latter do not satisfy the children's reading interests (39). The problem first grade teachers face in developing an individualized approach to reading is how to obtain books that are readable of an interest level that produces challenge to the child. If the freedom of choice and self-selection is inherent to the development of self-involvement in the learning process, and if self-involvement is vital to the development of independence and the acceptance of responsibility, a way must be found whereby these qualities can be developed apart from books in the early part of the learning to read process.

Teachers were able to bridge this chasm with extensive use of the children's own vocabulary in charts, story telling, and "let's pretend" role playing. Materials dictated by the children, based on their own experiences, real or imagined, were used for instructional purposes. Games, puzzles, displays, and various other means were used to make a knowledge and use of words intriguing and desirable. The teacher who was aware of the moment when a word or an idea became a part of a child's life was the teacher who succeeded in drawing a child into a mutual involvement in the learning process which opened the way to new

learning and growth. This is the philosophy inherent in individualized reading as contrasted with basal reading, and during the crucial early months of formal education may off-set the loss of books from which children can select freely according to interest.

Under the program that encouraged freedom of choice, the children read extensively as soon as an initial sight vocabulary and the rudiments of word analysis had been mastered. Observation of the books read revealed that they were not only reading voraciously but also that they were reading for a variety of purposes. Books which dealt with fact such as encyclopedias held as much attraction for some children as collections of fairy tales did for others. Poetry, jokes, and drama were read by many, and the delight experienced through reading was equalled by the delight experienced in sharing what was read.

While neither the analysis of reading skills nor the test of attitude development indicated a significant difference between the two Groups, the statistical analysis of books read by number, difficulty, and type gave evidence that the individualized method encouraged extensive reading to a greater degree than did the basal method. The atmosphere of the classrooms where the individualized method was being used gave further evidence of the enthusiasm generated by this approach. Books were in view everywhere, and the chalkboards, charts, and bulletin boards were filled with a variety of clues that reading was a successful experience enjoyed by everyone including the teacher.

The experiences of the Maury School in Richmond, Virginia, have become classic examples of the interest, enthusiasm, and growth that can be achieved when creative teachers face the inappropriateness of

traditional materials for instruction for the area and for the children they are teaching (28). This bridge between the child, his loves, hates, fears, and triumphs, and his reading, essential to the success of individualized reading at every age, is imperative also at the beginning stage. It is being done successfully not only at Maury School but wherever teachers feel free to break with tradition and go in search of ways to make the child rather than the textbook the core around which growth takes place.

True freedom of choice is necessary for success in individualized reading. Whether it was achieved by all the teachers of Group 2 in this study is doubtful. The strong bias toward basal reading and the limited understanding of the individualized philosophy may have made it difficult for the teacher to establish an atmosphere of freedom and acceptance without teacher control during the first months of the study. The difficulty in obtaining reading material from which a choice could be made necessitated the use of pre-primers and primers from basal series.

If freedom of choice as a function of self-involvement is to have maximum effectiveness, the teacher must be helped to see her role as a guide rather than as a director, and helped to experience mutual involvement in the learning process. If self-selection is to be possible, books must be available which deal with the interests and concepts of children using a minimum, realistic vocabulary. Perhaps these books need to be written by children in order to appeal to the child at this pre-reading level of maturity.

On the basis of analysis of the problems which arose from the

strong bias toward basal reading held by the teachers at the beginning of the study, and the difficulty encountered in obtaining suitable instructional material during the first months of the study, it might be concluded that part of the lack of significance in the analysis of variance between the two methods stemmed not from an equality between the two approaches but from the unusual demands made on the teachers of Group 2 in the early weeks of instruction. That the basal reader approach fared no better may further emphasize the need to look to the creative teacher rather than to the method for maximum success.

Teacher-Pupil Conference

The teacher-pupil conference replaced the scheduled reading class for the individualized approach and was, therefore, one of the practices which differentiated between the two methods.

Krippner writes in an article entitled "Reading Instruction and Existential Philosophy,"

The teacher must never forget that his real purpose in the classroom is to educate somebody else. To do this, the existential "I-Thou" relationship is encouraged between pupil and teacher, a relationship in which one person commits himself to the education of another and constantly risks himself as he attempts to achieve his goal (5, pp. 61-62).

In making this commitment and in taking this risk, the teacher becomes a part of the involvement. The conference period is not merely a listening-diagnosing task, but is an interaction with the child where each gives as well as receives, shares as well as probes. It is a function of the "I-Thou" relationship which enhances personal growth.

In discussing the individual conferences, one teacher enthusiastically reported, "We love these conferences—the child and I. Here

we laugh together and wonder together. Ours is a companionship on the road to learning, for he teaches me as much as I teach him, and we are both richer for it."

Another teacher, who had had over twenty years of teaching basal reading and now was involved in individualized reading, spoke with deep regret over the many lost opportunities for personal involvement. "I thought I knew the children and that I was meeting the need of each," she said, "but now I know that I was seeing only group needs. The individual problem was covered up by the aggregate problems of the group. Now I am beginning to feel the tremendous potential of each youngster in the room, and I am challenged, thrilled, and have become a better teacher because of it."

The question arises, however, whether every teacher can establish this warm, personal relationship with each pupil in the class. Not every teacher is able to create conditions under which children "would not only be able to gain self-enhancement through the discovery of their talents and areas of strength, but would also be encouraged to discover their weaknesses and inadequacies under conditions in which they would feel adequate enough to acknowledge and deal with them" (12, p. 378). This is the ultimate purpose of individual conferences, and the success of the teacher will be largely dependent upon the kind of person the teacher is. To quote Combs again, "In a very large measure, effective teaching is a process of sharing self with others. Inadequate personalities find this very difficult to do. The ability to involve and to share self with others is highly dependent upon the individual's own feelings of his personal adequacy" (12, p. 406).

Whether the lack of significance between the results of these two opposed methods of teaching lay partially in the personality of one or more teachers is a question that cannot be answered. However, if personal and mutual involvement in the learning process frees intelligence to function at a higher level of achievement, then the elements which produce this involvement need to be identified. Freedom of choice, self-selection, and the interaction of teacher and pupil in the reading conference may be elements which function to develop freedom to learn. If teachers can be helped to develop a feeling of personal adequacy, the teacher-pupil conference may become one of the most important aspects of the individualized reading program.

Attitude

One of the criteria for measuring the development of attitude was a comparison of books read under the assumption that a positive attitude toward reading would result in reading by choice and with enthusiasm. As was stated earlier in this study, an analysis of the books read revealed that Group 2 read almost three times as many books as Group 1, and these books tended to be more difficult and to be selected from a wider scope of subjects and types. While a great many basal readers were read as supplementary books by both groups, these were ruled out of the analysis. Only those books which were classified as leisure time reading were included, although it must be acknowledged that at times these were used for instructional purposes in Group 2.

According to the analysis of variance the avid reading of books at this age level is not necessarily a factor in developing a positive

attitude toward reading in general. If the number of books, the degree of difficulty, and the variety of types were an indication of a positive attitude toward reading, the analysis of variance would have shown a significant difference between methods for attitude. However, the result of the analysis indicated a greater difference between boys and girls than between methods.

The difficulty of obtaining a true measurement of attitude was demonstrated when the investigator asked the class, "Is reading your favorite subject in school?" and received an overwhelming affirmative response. When the question "Which do you prefer, reading or gym?" was asked, the response was equally affirmative in favor of gym. Where does the truth lie?

The San Diego County Inventory of Reading Attitude was selected for use in this study on the basis of the statement by the authors that a half-test reliability coefficient of .79 was obtained by correlating students' scores on the odd-numbered items with their scores on the even numbered items. Applying the Spearman-Brown Prophecy Formula, they estimated the whole-test reliability coefficient to be .89.

One of the true tests of attitude is observed when children read by choice, eagerly share what they read, and prove their understanding of what they read by volunteering information at appropriate times. That this stage of maturity is a gradual process of development was one of the discoveries made in this study. Children need to grow into the skill of self-selection, and the very novelty of reading is at first so great that selection is a goal in itself. The point where reading becomes a road to greater self-fulfillment, to communication, and to

understanding may be delayed, but if they read as avidly as the children in Group 2 were reading, it will come. One teacher described it as a flower coming to full bloom. "Suddenly it was there!" she said. "The children were seeking, sharing, laughing, and even crying over what they found in books. Our room became alive, and teaching became an overwhelming thrill." Who cares about attitude factors and scores when this can happen in a first grade?

Can it happen under a basal reading system? Yes, but the road is more difficult. In reporting the small number of books the children read over a given period, one teacher remarked, "But Johnny never gets through with his work. Therefore he does not have time to read." Can this philosophy produce the involved, astute, mature reader if he sees reading as something to do when all his tasks are finished? If Johnny cannot finish his work in the first and second grade, his chances as an adult must be even less. Reading--free, leisure time reading--must be established as being as important as his so-called "work" if he is to achieve the high goals set for future Americans.

Teacher and Parent Response

The response of the teachers was a modified acceptance of individualized reading on the first year level to enthusiastic support on the second year level. The lack of adequate material made the first months of the first year difficult, but as the children attained greater facility with a reading vocabulary, teaching materials became more easily available. The enthusiasm of the teachers for individualization was one of the strengths of the study. Some of the responses given in the re-

ports they made at the end of the study will give an evaluation of the intangibles which must be considered when evaluating two methods.

One of the teachers reported that the children never "found time on their hands" because they soon turned to books and reading in preference to play activity.

A substitute teacher expressed her surprise at the change in atmosphere in the classroom and attributed it to the degree of independence achieved at the second year level. "Detailed lesson plans are no longer necessary in reading. The children know what they are to do and where they are going. I need only go with them!"

One second grade teacher who had been interested in creative dramatics now found time to introduce it into the language arts program because she was no longer bound to the reading groups and the workbooks. It was a common reaction from those involved in the individualized program that they now had time to do so much more with the children because reading could be approached in so many different ways.

A first grade teacher discovered she had found new life in teaching. "After fourteen years, I was very weary with Dick and Jane. I was thinking seriously of asking to be transferred to a higher grade in hopes of finding new inspiration. But my weariness vanished when Stephan brought a National Geographic and asked, with sparkling eyes, if he could report on an article he had read about volcanoes! This was the beginning of our individualization."

These and many other comments indicated that the teachers found the freedom and variety as challenging and as intriguing as the children did. One of the administrators summed up the responses of the teachers

by saying, "In all my years of administration, I have never seen such a display of enthusiasm over teaching anything as these teachers have shown over individualized reading."

The attitude of the parents was more difficult to evaluate since there was less communication. It was feared that parents might object to having no indication of reading progress on the child's report card. The purpose of this procedure was explained to those who asked, and they readily accepted the suggestion that they evaluate the progress of their own child by hearing him read.

One mother said, "My two older boys always fought and scuffled when they weren't eating or sleeping. Somehow their younger brother has brought reading into our home and our whole life is changed." Another mother, whose son was in the sixth grade, ruefully remarked, "Why didn't we do this six years ago?" Perhaps the enthusiasm of the parents for the individualized program was most clearly reflected by the hours they volunteered to organize libraries and by the fact that not one parent requested that his child be transferred from the individualized group into the basal reader.

Implications for Further Research

Successful research will find answers; it will also raise questions to be answered in further research. The following are recommendations for studies that continue where this study ends.

Attitude

The results of the analysis of variance and the results of the analysis of books read were not in agreement on the measurement of

attitude development. According to the analysis of variance, sex was the only significant factor, but according to the analysis of books read, the method of instruction was highly significant. Further research is needed to identify the factors that contribute to a positive attitude toward reading. When these factors have been identified, research will be needed to establish an adequate measuring scale for children in the primary grades whose interests vacillate unendingly.

Interaction of Sex and Intelligence

According to this study, both sex and intelligence were significant factors in the development of reading skill. The interaction of the two was not significant. However, the identification of the highly intelligent girl as being the significantly high achiever indicates that the interaction of sex and intelligence may be more important than the results of this study indicate. It warrants further study. Such research might also investigate whether grouping for instruction by sex and by ability might be more successful than ability grouping under the basal program. (32).

Teacher Adequacy

One of the questions raised concerning individualized reading is whether teachers are prepared for this highly personalized method of instruction through the present programs of teacher education. Research is needed to determine the skills and understandings needed for successful teaching of the individualized approach to reading and to discover ways in which these features can be developed. A year of in-service education which emphasizes the philosophy and practices of both

approaches to reading might precede the selection of the participating teachers and augment the seminars held during the study. An analysis of results of teaching after completion of a teacher education curriculum concentrating on one or both of these methods, including a supervised internship in reading, would help teachers be better prepared for participation in research directed toward identification of needed skills and understandings as well as for participation in research directed toward a comparison of results achieved by the children taught under the two approaches.

Testing Vocabulary and Comprehension

Standardized reading tests have been constructed on word lists that have assumed vocabulary control in the reading program. Research is needed to determine whether the vocabulary tested bears a resemblance to the personalized vocabulary developed through individualized instruction. The same problem exists in testing comprehension. It can be assumed that certain activities have been experienced by children taught by the basal method. This assumption cannot be made for children taught under the individualized method. How can vocabulary and comprehension be validly tested with individualized instruction?

Comparison of Method

Further longitudinal research is needed in comparing results of individualized reading with other methods. Research similar to this study needs to be carried through the primary grades to the point where a child reads with ease and understanding for both content and pleasure. This might be the end of the third grade. A concomitant study beginning

with the fourth grade and continuing through the sixth grade would increase the value of the first study and give needed data for understanding the development of reading through this period of growth. A longitudinal study over the twelve years of elementary and secondary instruction would give us the most valid data on which to judge the superiority of an approach to reading.

Relationship between Socio-Economic Status and Reading

The data of this study indicates a positive correlation between socio-economic status identified by the occupation of the father and both achievement of reading skills and development of a positive attitude toward reading under the basal program. This correlation was not evident under the individualized program. Further study is needed to determine whether the child who is socially and culturally deprived may have a better chance for success under individualized instruction in reading than under the basal approach. The deprived child may find greater incentive to read when he can select reading material from areas of his own interests than when he is forced into the stereotyped family of most basal reading programs.

EPILOGUE

This study has not proven the superiority of one method over the other, but it has brought into focus some of the problems and advantages faced in each method. The determining factor will be whether Johnny is able to respond to the ideas, the assumptions, the totality of what he reads with the totality of what he is, and whether he is able to continue this response through life. This is the final measure upon which the superiority of a method can be judged.

APPENDICES

APPENDIX A

Questionnaire to Parents

QUESTIONNAIRE TO PARENTS

Dear Parents:

It long has been thought that various aspects of the home environment contribute to success in reading. This is one of the factors on which we hope to gain information in the research in reading now in progress in your school.

Would you please take a few minutes now and fill in the information requested below and return it to your child's teacher tomorrow? We appreciate your assistance and believe that your cooperation will help establish better approaches to the teaching of reading in the primary grades.

Yours sincerely,

(Signed) Elizabeth Teigland
Director of Reading Research

.....

NAME _____ SCHOOL _____

DATE OF BIRTH _____ SEX: Male _____ Female _____

COUNTRY OF BIRTH _____ RACE: White _____ Nonwhite _____

NUMBER OF YEARS IN SCHOOL: Nursery School _____ First Grade _____
Kindergarten _____ Second Grade _____

FATHER: Name _____ Education _____
Occupation _____ (Years in school or degrees received)

MOTHER: Name _____ Education _____
Occupation _____

BROTHERS: Number older _____ Number Younger _____

SISTERS: Number older _____ Number Younger _____

STATUS OF PARENTS: Living Together _____ Living Apart _____ Divorced _____
Father Deceased _____ Mother Deceased _____
Father Remarried _____ Mother Remarried _____

LANGUAGES SPOKEN IN THE HOME: English _____ Other _____

APPENDIX B

- Table 35. Raw Data for Chronological Age, Mental Age, Vocabulary, Comprehension, and Attitude Scores Basal Method, First and Second Years
- Table 36. Raw Data for Chronological Age, Mental Age, Vocabulary, Comprehension, and Attitude Scores Individualized Method, First and Second Years

TABLE 35

RAW DATA FOR CHRONOLOGICAL AGE, MENTAL AGE, VOCABULARY,
COMPREHENSION, AND ATTITUDE SCORES BASAL METHOD,
FIRST AND SECOND YEARS

Sub- ject	CA	MA	First Year			Second Year		
			Voc	Com	Att	Voc	Com	Att
1	7-11	10-0	64	8	17	41	44	15
2	8-1	8-1	56	4	14	38	29	19
3	7-9	7-7	55	4	11	26	26	10
4	7-6	8-9	56	11	24	36	38	19
5	7-7	8-8	50	10	20	39	41	19
6	7-3	8-9	57	5	16	41	41	16
7	7-7	8-4	35	3	18	26	19	22
8	8-0	8-0	39	2	16	27	13	20
9	7-5	8-6	63	7	2	40	40	7
10	7-10	8-11	43	3	13	33	32	18
11	7-5	7-5	68	8	17	43	38	15
12	7-6	6-11	20	2	11	12	2	12
13	7-4	8-5	65	12	14	45	47	18
14	7-10	7-1	43	6	17	35	22	17
15	7-5	8-7	43	9	15	40	41	16
16	7-8	8-5	71	5	17	41	40	13
17	7-11	8-7	73	15	18	44	44	18
18	7-3	9-3	74	12	18	43	50	16
19	7-10	9-5	65	8	8	31	38	11
20	8-1	9-9	72	12	14	44	45	18
21	7-4	7-4	38	1	22	13	9	8
22	7-3	7-3	68	6	17	40	41	21
23	7-7	8-9	69	15	18	45	48	20
24	7-3	8-11	67	8	17	44	38	13
25	7-7	8-4	67	10	18	44	41	16
26	7-3	8-6	55	9	22	36	39	15
27	7-4	7-11	56	8	16	35	32	22
28	7-11	7-5	47	3	15	37	31	12
29	7-2	8-5	65	11	12	41	41	14
30	7-4	9-4	66	9	20	38	49	23
31	7-4	8-6	66	13	19	43	44	19
32	7-6	8-4	65	10	20	32	24	21
33	7-9	8-6	42	7	16	24	19	15
34	7-9	9-9	70	15	20	45	44	18
35	7-7	9-8	74	15	16	45	52	17

TABLE 35—Continued

Sub- ject	CA	MA	First Year			Second Year		
			Voc	Com	Att	Voc	Com	Att
36	7-10	8-6	69	10	17	42	45	10
37	7-7	9-8	62	5	15	29	39	15
38	8-0	8-11	68	15	25	43	50	23
39	7-6	9-1	64	13	20	40	45	21
40	8-0	10-0	69	14	16	41	47	15
41	8-2	8-11	69	7	18	37	43	24
42	7-11	8-1	66	7	11	39	36	16
43	7-3	8-11	69	12	18	40	42	14
44	7-5	8-9	65	9	14	35	41	12
45	7-7	9-7	65	12	15	43	39	19
46	7-7	8-1	67	14	20	45	49	24
47	7-4	9-0	74	14	21	40	45	13
48	7-11	8-11	73	12	19	41	49	23
49	7-4	8-11	68	12	20	43	49	23
50	7-10	8-6	67	10	20	45	45	21
51	7-8	7-8	62	5	10	38	40	13
52	7-8	8-11	68	10	21	45	45	23
53	7-9	10-2	73	15	22	45	53	20
54	7-11	6-6	53	5	19	39	16	12
55	7-9	8-6	72	15	17	45	42	5
56	7-5	8-5	56	8	20	40	42	12
57	7-4	7-8	67	13	21	44	45	20
58	7-5	9-3	56	6	18	38	30	10
59	7-9	9-1	59	9	18	37	36	19
60	7-6	9-0	70	12	22	41	50	17
61	7-11	8-7	53	6	20	43	38	15
62	7-7	8-1	53	6	14	35	29	11
63	7-6	8-3	57	8	21	34	36	24
64	8-1	8-1	38	4	20	21	26	19
65	7-10	9-3	68	13	21	44	48	19

Summary

Σ =	3947	587	1121	2478	2482	1085
N =	65	65	65	65	65	65
\bar{X} =	68.72	4.03	17.25	38.12	38.18	10.69
S.D.=	11.46	3.89	3.72	7.27	10.76	4.56

TABLE 36

RAW DATA FOR CHRONOLOGICAL AGE, MENTAL AGE, VOCABULARY,
COMPREHENSION, AND ATTITUDE SCORES INDIVIDUALIZED
METHOD, FIRST AND SECOND YEARS

Sub- ject	CA	MA	First Year			Second Year		
			Voc	Com	Att	Voc	Com	Att
66	7-7	8-2	69	8	19	40	44	15
67	8-1	8-2	54	6	20	35	41	19
68	7-9	7-2	50	7	19	29	34	15
69	7-7	7-11	63	7	15	41	33	18
70	8-0	9-4	64	10	18	42	50	12
71	7-6	6-9	16	1	13	10	2	21
72	9-0	9-1	64	7	14	41	42	21
73	7-7	8-10	62	9	14	44	43	16
74	7-10	7-10	53	7	20	38	39	14
75	7-10	7-6	58	13	19	38	38	20
76	7-7	8-4	56	5	17	40	40	18
77	8-1	8-1	49	3	16	30	24	14
78	7-6	7-7	65	14	17	44	44	17
79	8-0	8-8	75	15	20	45	50	22
80	7-10	8-10	72	8	19	43	41	14
81	8-1	8-8	70	12	22	43	39	20
82	8-4	8-5	46	6	16	22	26	6
83	7-7	7-7	58	6	14	42	45	19
84	7-11	8-5	68	9	16	43	39	24
85	7-4	7-6	57	5	20	38	44	23
86	7-6	8-7	46	3	20	31	32	20
87	7-3	7-11	49	1	16	35	31	16
88	8-0	8-5	53	5	23	39	41	23
89	7-9	7-11	48	8	20	37	41	17
90	8-1	9-5	64	8	16	44	48	19
91	7-5	7-10	61	9	15	39	42	17
92	8-0	8-5	66	7	13	42	41	19
93	7-8	7-10	59	8	22	37	38	17
94	7-11	7-0	41	7	14	35	32	21
95	7-3	8-3	47	4	16	34	31	8
96	7-8	9-0	68	14	16	44	43	20
97	7-3	8-11	61	4	15	44	46	17
98	7-4	8-5	51	7	22	37	31	21
99	8-1	8-8	67	12	19	42	52	17
100	7-8	7-7	61	6	19	41	36	20

TABLE 35—Continued

Sub- ject	CA	MA	First Year			Second Year		
			Voc	Com	Att	Voc	Com	Att
101	8-2	8-8	47	5	17	37	38	16
102	7-3	8-8	66	13	20	43	50	21
103	7-5	7-6	39	7	10	39	41	12
104	7-3	6-9	30	3	15	19	10	11
105	7-11	8-6	52	4	11	35	35	16
106	7-5	8-4	64	6	8	38	41	8
107	7-3	8-5	72	14	13	44	48	19
108	7-4	8-3	61	3	19	43	32	20
109	7-9	7-4	65	6	11	43	40	17
110	7-8	8-2	44	8	21	40	39	17
111	7-4	6-8	48	6	8	32	25	12
112	8-0	7-7	38	3	14	30	10	18
113	7-3	9-3	63	8	23	42	38	23
114	8-2	9-5	73	14	21	42	48	22
115	7-3	9-3	72	14	22	43	49	25
116	8-1	8-4	66	11	21	44	41	17
117	7-8	8-9	34	3	8	33	29	16
118	7-11	8-3	54	8	13	35	36	16
119	8-1	9-0	71	15	25	45	50	22
120	8-0	9-0	74	15	23	44	49	24
121	7-7	9-3	72	14	25	44	45	23
122	7-5	7-3	67	9	24	39	33	17
123	7-9	8-0	68	11	14	41	39	14
124	8-1	10-2	69	11	13	44	50	8
125	7-6	10-1	71	15	24	42	52	19
126	7-6	7-11	68	14	22	45	52	19
127	7-11	9-1	67	13	21	41	45	24
128	7-8	7-2	36	5	20	31	26	22
129	7-7	8-7	33	6	19	29	10	20
130	7-7	8-11	71	13	20	42	41	16
131	7-6	8-6	58	12	15	38	42	12
132	7-6	6-3	62	11	14	36	38	11
133	8-0	7-10	61	12	23	36	38	24
134	7-9	7-6	30	6	24	18	24	12

Summary

Σ =	3977	579	1215	2626	2627	1213
N=	69	69	69	69	69	69
\bar{X} =	57.64	8.39	17.61	38.06	38.07	17.58
S.D.=	12.74	3.91	4.27	6.85	10.34	4.34

APPENDIX C

- Table 37. Data Used in Computation of Analysis of Variance Vocabulary, Second Year
- Table 38. Data Used in Computation of Analysis of Variance Comprehension, Second Year
- Table 39. Data Used in Computation of Analysis of Variance Attitude, Second Year
- Table 40. Data Used in Computation of Analysis of Variance Vocabulary, First Year
- Table 41. Data Used in Computation of Analysis of Variance Comprehension, First Year
- Table 42. Data Used in Computation of Analysis of Variance Attitude, First Year

TABLE 37

DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
VOCABULARY, SECOND YEAR

Group	Sex	Intelligence				Sum	Mean
		Actual	Lower Adjusted	Actual	Upper Adjusted		
1 Basal	M	$\Sigma X = 501$	$\Sigma X = 572.57$	$\Sigma X = 810$	$\Sigma X = 617.14$	$\Sigma \Sigma X_R = 1189.71$	37.16
		$N = 14$	$N = 16$	$N = 21$	$N = 16$		
		$\bar{X} = 35.79$	$\bar{X} = 35.79$	$\bar{X} = 38.57$	$\bar{X} = 38.57$	$\Sigma \Sigma X_R^2 = 46287.62$	
		$\Sigma X^2 = 19411$	$\Sigma X^2 = 22184$	$\Sigma X^2 = 31636$	$\Sigma X^2 = 21103.62$		
			$\Sigma X^2 = 1694.22$		$\Sigma X^2 = 299.76$		
F		$\Sigma X = 443$	$\Sigma X = 545.23$	$\Sigma X = 724$	$\Sigma X = 681.41$	$\Sigma \Sigma X_R = 1226.64$	38.33
		$N = 13$	$N = 16$	$N = 17$	$N = 16$		
		$\bar{X} = 34.08$	$\bar{X} = 34.08$	$\bar{X} = 42.59$	$\bar{X} = 42.59$	$\Sigma \Sigma X_R^2 = 48619.58$	
		$\Sigma X^2 = 15874$	$\Sigma X^2 = 19537.23$	$\Sigma X^2 = 30900$	$\Sigma X^2 = 29082.35$		
			$\Sigma X^2 = 957.49$		$\Sigma X^2 = 62.38$		
		$\Sigma \Sigma X_C = 1117.80$		$\Sigma \Sigma X_C = 1298.55$		$\Sigma \Sigma X_B = 2416.35$	
		$\Sigma \Sigma X_C^2 = 41721.23$		$\Sigma \Sigma X_C^2 = 53185.97$		$\Sigma \Sigma X_B^2 = 94907.20$	

2 Indi- vidu- alized	M	$\Sigma X = 657$ $\bar{X} = 19$ $\Sigma X^2 = 23971$	$\Sigma X = 553.26$ $\bar{X} = 16$ $\Sigma X^2 = 20186.11$ $\Sigma X^2 = 1055.07$	$\Sigma X = 630$ $\bar{X} = 16$ $\Sigma X^2 = 25188$ $\Sigma X^2 = 381.75$	$\Sigma X = 630$ $\bar{X} = 16$ $\Sigma X^2 = 25188$ $\Sigma X^2 = 381.75$	$\Sigma X_R = 1183.26$ $\Sigma X_R^2 = 45374.11$	$\Sigma X_R = 1183.26$ $\Sigma X_R^2 = 45374.11$	36.98
	F	$\Sigma X = 864$ $\bar{X} = 23$ $\Sigma X^2 = 33424$	$\Sigma X = 601.04$ $\bar{X} = 16$ $\Sigma X^2 = 20186.11$ $\Sigma X^2 = 1055.07$	$\Sigma X = 475$ $\bar{X} = 11$ $\Sigma X^2 = 20551$	$\Sigma X = 475$ $\bar{X} = 11$ $\Sigma X^2 = 20551$	$\Sigma X_R = 1291.95$ $\Sigma X_R^2 = 53143.84$	$\Sigma X_R = 1291.95$ $\Sigma X_R^2 = 53143.84$	40.38
		$\Sigma X_C = 1154.30$ $\Sigma X_C^2 = 43437.59$		$\Sigma X_C = 1320.91$ $\Sigma X_C^2 = 55080.36$		$\Sigma X_B = 2475.21$ $\Sigma X_B^2 = 98517.95$		

Summary

Column Sums	Row Sums	Flock Sums	CRB Sums
Lower I.Q. $\Sigma \Sigma X = 2272.10$ $\Sigma \Sigma X^2 = 85158.82$	Male $\Sigma \Sigma X = 2372.97$ $\Sigma \Sigma X^2 = 91661.73$	Basal $\Sigma \Sigma X = 2416.35$ $\Sigma \Sigma X^2 = 94907.20$	$\Sigma \Sigma X = 4891.56$ $\Sigma \Sigma X^2 = 193425.15$ $\Sigma \Sigma X^2 = 5181.65$
Upper I.Q. $\Sigma \Sigma X = 2619.46$ $\Sigma \Sigma X^2 = 108266.33$	Female $\Sigma \Sigma X = 2518.59$ $\Sigma \Sigma X^2 = 101763.42$	Individualized $\Sigma \Sigma X = 2475.21$ $\Sigma \Sigma X^2 = 98517.95$	

TABLE 38
 DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
 COMPREHENSION, SECOND YEAR

Group	Sex	Intelligence				Sum	Mean
		Actual	Lower Adjusted	Actual	Upper Adjusted		
1 Basal	M	$\Sigma X = 437$	$\Sigma X = 499.42$	$\Sigma X = 856$	$\Sigma X = 652.19$	$\Sigma \Sigma X_R = 1151.62$	35.99
		$N = 14$	$N = 16$	$N = 21$	$N = 16$		
		$\bar{X} = 31.21$	$\bar{X} = 31.21$	$\bar{X} = 40.76$	$\bar{X} = 40.76$	$\Sigma \Sigma X_R^2 = 45511.24$	
		$\Sigma X^2 = 16061$	$\Sigma X^2 = 18355.43$	$\Sigma X^2 = 35642$	$\Sigma X^2 = 27155.81$		
			$\Sigma X^2 = 2766.11$		$\Sigma X^2 = 571.32$		
F	F	$\Sigma X = 405$	$\Sigma X = 498.46$	$\Sigma X = 784$	$\Sigma X = 737.88$	$\Sigma \Sigma X_R = 1236.34$	38.64
		$N = 13$	$N = 16$	$N = 17$	$N = 16$		
		$\bar{X} = 31.15$	$\bar{X} = 31.15$	$\bar{X} = 46.12$	$\bar{X} = 46.12$	$\Sigma \Sigma X_R^2 = 51580.02$	
		$\Sigma X^2 = 14075$	$\Sigma X^2 = 17323.08$	$\Sigma X^2 = 36398$	$\Sigma X^2 = 34256.94$		
			$\Sigma X^2 = 1794.06$		$\Sigma X^2 = 227.54$		
		$\Sigma \Sigma X_C = 997.89$	$\Sigma \Sigma X_C = 1390.07$	$\Sigma \Sigma X_C = 1390.07$	$\Sigma \Sigma X_C = 61412.75$	$\Sigma \Sigma X_B = 2387.96$	$\Sigma \Sigma X_B = 97091.26$
		$\Sigma \Sigma X_C^2 = 35678.51$		$\Sigma \Sigma X_C^2 = 61412.75$			

2 Indi- vidu- alized	M	$\Sigma X = 618$ $N = 19$ $\bar{X} = 32.53$ $\Sigma X^2 = 23228$	$\Sigma X = 520.42$ $N = 16$ $\bar{X} = 32.53$ $\Sigma X^2 = 19560.42$ $\Sigma X^2 = 2633.04$	$\Sigma X = 622$ $N = 16$ $\bar{X} = 38.88$ $\Sigma X^2 = 26000$	$\Sigma X = 622$ $N = 16$ $\bar{X} = 38.88$ $\Sigma X^2 = 26000$ $\Sigma X^2 = 1819.75$	$\Sigma X_R = 1142.42$ $\Sigma X_R^2 = 45560.42$	$\Sigma X_R = 1142.42$ $\Sigma X_R^2 = 45560.42$	$\Sigma X_R = 1142.42$ $\Sigma X_R^2 = 45560.42$	$\Sigma X_R = 1142.42$ $\Sigma X_R^2 = 45560.42$
	F	$\Sigma X = 875$ $N = 23$ $\bar{X} = 38.04$ $\Sigma X^2 = 34121$	$\Sigma X = 608.69$ $N = 16$ $\bar{X} = 38.04$ $\Sigma X^2 = 23736.35$ $\Sigma X^2 = 579.45$	$\Sigma X = 512$ $N = 11$ $\bar{X} = 46.55$ $\Sigma X^2 = 23944$	$\Sigma X = 744.73$ $N = 16$ $\bar{X} = 46.55$ $\Sigma X^2 = 34827.64$ $\Sigma X^2 = 163.97$	$\Sigma X_R = 1353.42$ $\Sigma X_R^2 = 58563.99$	$\Sigma X_R = 1353.42$ $\Sigma X_R^2 = 58563.99$	$\Sigma X_R = 1353.42$ $\Sigma X_R^2 = 58563.99$	$\Sigma X_R = 1353.42$ $\Sigma X_R^2 = 58563.99$
		$\Sigma X_C = 1129.11$ $\Sigma X_C^2 = 43296.77$		$\Sigma X_C = 1366.73$ $\Sigma X_C^2 = 60827.64$		$\Sigma X_B = 2495.84$ $\Sigma X_B^2 = 104124.41$	$\Sigma X_B = 2495.84$ $\Sigma X_B^2 = 104124.41$	$\Sigma X_B = 2495.84$ $\Sigma X_B^2 = 104124.41$	$\Sigma X_B = 2495.84$ $\Sigma X_B^2 = 104124.41$

Summary

	Column Sums	Row Sums	Block Sums	RBC Sums
Lower I.Q.	$\Sigma X = 2127.00$ $\Sigma X^2 = 78975.28$	Male $\Sigma X = 2294.04$ $\Sigma X^2 = 91071.66$	Basal $\Sigma X = 2387.96$ $\Sigma X^2 = 97091.26$	$\Sigma X = 4883.80$ $\Sigma X^2 = 201215.67$ $\Sigma X^2 = 10555.24$
Upper I.Q.	$\Sigma X = 2756.80$ $\Sigma X^2 = 122240.39$	Female $\Sigma X = 2589.76$ $\Sigma X^2 = 110144.01$	Individualized $\Sigma X = 2495.84$ $\Sigma X^2 = 104124.41$	

TABLE 39
 DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
 ATTITUDE, SECOND YEAR

Group	Sex	Intelligence				Sum	Mean
		Actual	Lower Adjusted	Actual	Upper Adjusted		
1 Basal	M	$\Sigma X = 210$	$\Sigma X = 240$	$\Sigma X = 327$	$\Sigma X = 249.14$	$\Sigma \Sigma X_R = 489.14$	15.28
		$\frac{N}{\bar{X}} = \frac{14}{15}$ $\Sigma X^2 = 3412$	$\frac{N}{\bar{X}} = \frac{16}{15}$ $\Sigma X^2 = 3899.43$ $\Sigma X^2 = 299.43$	$\frac{N}{\bar{X}} = \frac{21}{15.57}$ $\Sigma X^2 = 5423$	$\frac{N}{\bar{X}} = \frac{16}{15.57}$ $\Sigma X^2 = 4131.81$ $\Sigma X^2 = 252.30$		$\Sigma \Sigma X_R^2 = 8031.24$
	F	$\Sigma X = 230$	$\Sigma X = 283.08$	$\Sigma X = 318$	$\Sigma X = 299.29$	$\Sigma \Sigma X_R = 582.37$	18.20
		$\frac{N}{\bar{X}} = \frac{13}{17.69}$ $\Sigma X^2 = 4412$	$\frac{N}{\bar{X}} = \frac{16}{17.69}$ $\Sigma X^2 = 5430.15$ $\Sigma X^2 = 421.87$	$\frac{N}{\bar{X}} = \frac{17}{18.71}$ $\Sigma X^2 = 6156$	$\frac{N}{\bar{X}} = \frac{16}{18.71}$ $\Sigma X^2 = 5793.88$ $\Sigma X^2 = 195.32$		$\Sigma \Sigma X_R^2 = 11224.03$
		$\Sigma \Sigma X_C = 523.08$ $\Sigma \Sigma X_C^2 = 9329.58$		$\Sigma \Sigma X_C = 548.43$ $\Sigma \Sigma X_C^2 = 9925.69$		$\Sigma \Sigma X_B = 1071.51$ $\Sigma \Sigma X_B^2 = 19255.27$	

2 Indi- vidu- alized	M	$\Sigma X = 316$ $N = 19$ $\bar{X} = 16.63$ $\Sigma X^2 = 5420$	$\Sigma X = 266.11$ $N = 16$ $\bar{X} = 16.63$ $\Sigma X^2 = 4564.21$ $\Sigma X^2 = 138.46$	$\Sigma X = 273$ $N = 16$ $\bar{X} = 17.06$ $\Sigma X^2 = 5137$	$\Sigma X = 273$ $N = 16$ $\bar{X} = 17.06$ $\Sigma X^2 = 5137$ $\Sigma X^2 = 478.94$	$\Sigma X_R = 539.11$ $\Sigma X_R^2 = 9701.21$	16.85
	F	$\Sigma X = 406$ $N = 23$ $\bar{X} = 17.65$ $\Sigma X^2 = 7586$	$\Sigma X = 282.44$ $N = 16$ $\bar{X} = 17.65$ $\Sigma X^2 = 5277.22$ $\Sigma X^2 = 291.63$	$\Sigma X = 218$ $N = 11$ $\bar{X} = 19.82$ $\Sigma X^2 = 4448$	$\Sigma X = 317.09$ $N = 16$ $\bar{X} = 19.82$ $\Sigma X^2 = 6469.82$ $\Sigma X^2 = 185.65$	$\Sigma X_R = 599.53$ $\Sigma X_R^2 = 11747.04$	18.74
		$\Sigma X_C = 548.55$ $\Sigma X_C^2 = 9841.43$		$\Sigma X_C = 590.09$ $\Sigma X_C^2 = 11606.82$		$\Sigma X_B = 1138.64$ $\Sigma X_B^2 = 21448.25$	

Summary

	Column Sums	Row Sums	Block Sums	RBC Sums
Lower I.Q.		Male	Basal	
	$\Sigma X = 1071.63$	$\Sigma X = 1028.25$	$\Sigma X = 1071.51$	$\Sigma X = 2210.15$
	$\Sigma X^2 = 19171.01$	$\Sigma X^2 = 17732.45$	$\Sigma X^2 = 19255.27$	$\Sigma X^2 = 40703.52$
Upper I.Q.		Female	Individualized	
	$\Sigma X = 1138.52$	$\Sigma X = 1181.90$	$\Sigma X = 1138.64$	$\Sigma X^2 = 2263.60$
	$\Sigma X^2 = 21532.51$	$\Sigma X^2 = 22971.07$	$\Sigma X^2 = 21448.25$	

TABLE 40
 DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
 VOCABULARY, FIRST YEAR

Group	Sex	Intelligence				Sum	Mean
		Actual	Lower Adjusted	Actual	Upper Adjusted		
1 Basal	M	$\Sigma X = 762$	$\Sigma X = 870.86$	$\Sigma X = 1308$	$\Sigma X = 996.57$	$\Sigma \Sigma X_R = 1867.43$	58.36
		$N = 14$ $\bar{X} = 54.43$ $\Sigma X^2 = 45020$	$N = 16$ $\bar{X} = 54.43$ $\Sigma X^2 = 51451.43$ $\Sigma X^2 = 4051.61$	$N = 21$ $\bar{X} = 62.29$ $\Sigma X^2 = 82644$	$N = 16$ $\bar{X} = 62.29$ $\Sigma X^2 = 62966.86$ $\Sigma X^2 = 894.75$		
F	F	$\Sigma X = 683$	$\Sigma X = 910.67$	$\Sigma X = 1194$	$\Sigma X = 1061.33$	$\Sigma \Sigma X_R = 1972.00$	61.63
		$N = 12$ $\bar{X} = 56.92$ $\Sigma X^2 = 40175$	$N = 16$ $\bar{X} = 56.92$ $\Sigma X^2 = 53566.67$ $\Sigma X^2 = 1734.18$	$N = 18$ $\bar{X} = 66.33$ $\Sigma X^2 = 80236$	$N = 16$ $\bar{X} = 66.33$ $\Sigma X^2 = 71320.89$ $\Sigma X^2 = 919.55$		
		$\Sigma \Sigma X_C = 1781.53$ $\Sigma \Sigma X_C^2 = 105018.10$		$\Sigma \Sigma X_C = 2057.90$ $\Sigma \Sigma X_C^2 = 134287.75$		$\Sigma \Sigma X_B = 3839.43$ $\Sigma \Sigma X_B^2 = 239305.85$	

2 Indi- vidu- alized	M	$\Sigma X = 959$ $N = 19$ $\bar{X} = 50.47$ $\Sigma X^2 = 51919$	$\Sigma X = 807.58$ $N = 16$ $\bar{X} = 50.47$ $\Sigma X^2 = 43721.26$ $\Sigma X^2 = 2959.67$	$\Sigma X = 940$ $N = 16$ $\bar{X} = 58.75$ $\Sigma X^2 = 57652$ $\Sigma X^2 = 2427$	$\Sigma X = 940$ $N = 16$ $\bar{X} = 58.75$ $\Sigma X^2 = 57652$ $\Sigma X^2 = 2427$	$\Sigma X_R = 1747.58$ $\Sigma X_R^2 = 101373.26$	54.61
	F	$\Sigma X = 1317$ $N = 23$ $\bar{X} = 57.26$ $\Sigma X^2 = 77743$	$\Sigma X = 916.17$ $N = 16$ $\bar{X} = 57.26$ $\Sigma X^2 = 54082.86$ $\Sigma X^2 = 1621.25$	$\Sigma X = 761$ $N = 11$ $\bar{X} = 69.18$ $\Sigma X^2 = 52945$	$\Sigma X = 1106.91$ $N = 16$ $\bar{X} = 69.18$ $\Sigma X^2 = 77010.91$ $\Sigma X^2 = 432.80$	$\Sigma X_R = 2023.08$ $\Sigma X_R^2 = 131093.77$	63.22
		$\Sigma X_C = 1723.75$ $\Sigma X_C^2 = 97804.12$		$\Sigma X_C = 2046.91$ $\Sigma X_C^2 = 134662.91$		$\Sigma X_B = 3770.66$ $\Sigma X_B^2 = 232467.03$	

Summary

	Column Sums	Row Sums	Block Sums	RBC Sums
Lower I.Q.	Male $\Sigma X = 3505.28$ $\Sigma X^2 = 202822.22$	Male $\Sigma X = 3615.01$ $\Sigma X^2 = 215791.55$	Basal $\Sigma X = 3839.43$ $\Sigma X^2 = 239305.85$	$\Sigma X = 7610.09$ $\Sigma X^2 = 471772.88$ $\Sigma X^2 = 15040.81$
Upper I.Q.	Female $\Sigma X = 4104.81$ $\Sigma X^2 = 268950.66$	Female $\Sigma X = 3995.08$ $\Sigma X^2 = 255981.33$	Individualized $\Sigma X = 3770.66$ $\Sigma X^2 = 232467.03$	

TABLE 41
 DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
 COMPREHENSION, FIRST YEAR

Group	Sex	Intelligence				Sum	Mean
		Actual	Lower Adjusted	Actual	Upper Adjusted		
1 Basal	M	$\Sigma X = 106$	$\Sigma X = 121.14$	$\Sigma X = 197$	$\Sigma X = 150.10$	$\Sigma \Sigma X_R = 271.24$	8.48
		$N = 14$ $\bar{X} = 7.57$ $\Sigma X^2 = 1014$	$N = 16$ $\bar{X} = 7.57$ $\Sigma X^2 = 1158.86$ $\Sigma X^2 = 241.68$	$N = 21$ $\bar{X} = 9.38$ $\Sigma X^2 = 2069$	$N = 16$ $\bar{X} = 9.38$ $\Sigma X^2 = 1576.38$ $\Sigma X^2 = 168.26$	$\Sigma \Sigma X_R^2 = 2735.24$	
F		$\Sigma X = 73$	$\Sigma X = 97.33$	$\Sigma X = 211$	$\Sigma X = 187.56$	$\Sigma \Sigma X_R = 284.89$	8.90
		$N = 12$ $\bar{X} = 6.08$ $\Sigma X^2 = 577$	$N = 16$ $\bar{X} = 6.08$ $\Sigma X = 769.33$ $\Sigma X^2 = 177.29$	$N = 18$ $\bar{X} = 11.72$ $\Sigma X = 2611$	$N = 16$ $\bar{X} = 11.72$ $\Sigma X = 2320.89$ $\Sigma X^2 = 122.40$	$\Sigma \Sigma X_R^2 = 3090.22$	
		$\Sigma \Sigma X_G = 218.47$ $\Sigma \Sigma X_G^2 = 1929.19$		$\Sigma \Sigma X_G = 337.66$ $\Sigma \Sigma X_G^2 = 3897.27$		$\Sigma \Sigma X_B = 556.13$ $\Sigma \Sigma X_B^2 = 5825.46$	

2 Indi- vidu- alized	M	$\Sigma X = 132$ $N = 19$ $\bar{X} = 6.95$ $\Sigma X^2 = 1152$	$\Sigma X = 111.16$ $N = 16$ $\bar{X} = 6.95$ $\Sigma X^2 = 970.11$ $\Sigma X^2 = 197.82$	$\Sigma X = 128$ $N = 16$ $\bar{X} = 8.00$ $\Sigma X^2 = 1248$	$\Sigma X = 128$ $N = 16$ $\bar{X} = 8.00$ $\Sigma X^2 = 1248$ $\Sigma X^2 = 224$	$\Sigma X_R = 239.16$ $\Sigma X_R^2 = 2218.11$	7.48
	F	$\Sigma X = 176$ $N = 23$ $\bar{X} = 7.65$ $\Sigma X^2 = 1532$	$\Sigma X = 122.43$ $N = 16$ $\bar{X} = 7.65$ $\Sigma X^2 = 1065.74$ $\Sigma X^2 = 128.89$	$\Sigma X = 143$ $N = 11$ $\bar{X} = 13.00$ $\Sigma X^2 = 1957$	$\Sigma X = 208$ $N = 16$ $\bar{X} = 13.00$ $\Sigma X^2 = 2846.55$ $\Sigma X^2 = 142.55$	$\Sigma X_R = 330.43$ $\Sigma X_R^2 = 3912.29$	10.33
		$\Sigma X_G = 233.59$ $\Sigma X_G^2 = 2035.85$		$\Sigma X_G = 336.00$ $\Sigma X_G^2 = 4094.55$	$\Sigma X_B = 569.59$ $\Sigma X_B^2 = 6130.40$		

Summary

	Column Sum	Row Sums	Block Sums	RBC Sums
Lower I.Q.		Male	Basal	
	$\Sigma X = 452.06$	$\Sigma X = 510.40$	$\Sigma X = 556.13$	$\Sigma X = 1125.72$
	$\Sigma X^2 = 3964.04$	$\Sigma X^2 = 4953.35$	$\Sigma X^2 = 5825.46$	$\Sigma X^2 = 11955.86$
Upper I.Q.		Female	Individualized	
	$\Sigma X = 673.66$	$\Sigma X = 615.32$	$\Sigma X = 569.59$	$\Sigma X = 1402.89$
	$\Sigma X^2 = 7991.82$	$\Sigma X^2 = 7002.51$	$\Sigma X^2 = 6130.40$	

TABLE 4.2
 DATA USED IN COMPUTATION OF ANALYSIS OF VARIANCE
 ATTITUDE, FIRST YEAR

Group	Sex	Intelligence				Sum	Mean
		Actual	Lower	Upper	Adjusted		
1 Basal	M	$\Sigma X = 238$	$\Sigma X = 272$	$\Sigma X = 335$	$\Sigma X = 255.24$	$\Sigma \Sigma X_R = 527.24$	16.48
		$N = 14$ $\bar{X} = 17$ $\Sigma X^2 = 4166$	$N = 16$ $\bar{X} = 17$ $\Sigma X^2 = 4761.14$ $\Sigma X^2 = 137.14$	$N = 21$ $\bar{X} = 15.95$ $\Sigma X^2 = 5811$	$N = 16$ $\bar{X} = 15.95$ $\Sigma X^2 = 44.27.43$ $\Sigma X^2 = 355.97$		
F	F	$\Sigma X = 192$	$\Sigma X = 256$	$\Sigma X = 346$	$\Sigma X = 307.56$	$\Sigma \Sigma X_R = 563.56$	17.61
		$N = 12$ $\bar{X} = 16$ $\Sigma X^2 = 3554$	$N = 16$ $\bar{X} = 16$ $\Sigma X^2 = 4738.67$ $\Sigma X^2 = 642.67$	$N = 18$ $\bar{X} = 19.22$ $\Sigma X^2 = 6782$	$N = 16$ $\bar{X} = 19.22$ $\Sigma X^2 = 6028.44$ $\Sigma X^2 = 116.68$		
		$\Sigma \Sigma X_C = 528$ $\Sigma \Sigma X_C^2 = 9499.81$		$\Sigma \Sigma X_C = 562.8$ $\Sigma \Sigma X_C^2 = 10455.87$		$\Sigma \Sigma X_B = 1090.80$ $\Sigma \Sigma X_B^2 = 19955.68$	

2 Indi- vidu- alized	M	$\Sigma X = 289$ $N = 19$ $\bar{X} = 15.21$ $\Sigma X^2 = 4615$	$\Sigma X = 243.37$ $N = 16$ $\bar{X} = 15.21$ $\Sigma X^2 = 3886.32$ $\Sigma X^2 = 184.51$	$\Sigma X = 282$ $N = 16$ $\bar{X} = 17.63$ $\Sigma X^2 = 5326$	$\Sigma X = 282$ $N = 16$ $\bar{X} = 17.63$ $\Sigma X^2 = 5326$ $\Sigma X^2 = 355.75$	$\Sigma X_R = 525.37$ $\Sigma X_R^2 = 9212.32$	16.42
	F	$\Sigma X = 431$ $N = 23$ $\bar{X} = 18.74$ $\Sigma X^2 = 8389$	$\Sigma X = 299.83$ $N = 16$ $\bar{X} = 18.74$ $\Sigma X^2 = 5835.83$ $\Sigma X^2 = 217.43$	$\Sigma X = 213$ $N = 11$ $\bar{X} = 19.36$ $\Sigma X^2 = 4295$	$\Sigma X = 309.82$ $N = 16$ $\bar{X} = 19.36$ $\Sigma X^2 = 6247.27$ $\Sigma X^2 = 248.46$	$\Sigma X_R = 609.65$ $\Sigma X_R^2 = 12083.10$	19.05
		$\Sigma X_C = 543.20$ $\Sigma X_C^2 = 9722.15$		$\Sigma X_C = 591.82$ $\Sigma X_C^2 = 11573.27$		$\Sigma X_B = 1135.02$ $\Sigma X_B^2 = 21295.42$	

Summary

	Column Sums	Row Sums	Block Sums	RC Sums
Lower I.Q.	$\Sigma X = 1071.20$ $\Sigma X^2 = 19221.96$	Male $\Sigma X = 1052.61$ $\Sigma X^2 = 18400.89$	Basal $\Sigma X = 1090.80$ $\Sigma X^2 = 19955.68$	$\Sigma X = 2225.82$ $\Sigma X^2 = 41251.10$ $\Sigma X = 2258.61$
Upper I.Q.		Female $\Sigma X = 1173.21$ $\Sigma X^2 = 22850.21$	Individualized $\Sigma X = 1135.02$ $\Sigma X^2 = 21295.42$	

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BIOGRAPHICAL SKETCH

Anna Elizabeth Teigland was born September 6, 1917 at Minneota, Minnesota. After graduation from the Minneota High School and the Teacher Training Department of the high school at Tracy, Minnesota, she taught eight years in the rural elementary schools of Lyon County, Minnesota. In 1947 she was graduated from the Duluth State Teachers College with a Bachelor of Science degree. She received the Master of Arts degree with a major in sociology from the University of Minnesota in 1953.

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This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Education and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Education.

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